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W. B. No. 600

Received Sept. 16, 1916
Issued January 10, 1917

U. S. DEPARTMENT OF AGRICULTURE
WEATHER BUREAU
CHARLES F. MARVIN, Chief

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MONTHLY WEATHER REVIEW

SUPPLEMENT NO. 4

TYPES OF ANTICYCLONES OF THE UNITED STATES AND THEIR AVERAGE MOVEMENTS.

BY

EDWARD H. BOWIE AND R. HANSON WEIGHTMAN

WASHINGTON:
GOVERNMENT PRINTING OFFICE
1917

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ANNOUNCEMENT.

During the summer of 1913 the issue of the system of publications of the Department of Agriculture was changed and simplified so as to eliminate numerous independent series of Bureau bulletins. In accordance with this plan, among other changes, the series of quarto bulletins—lettered from A to Z—and the octavo bulletins—numbered from 1 to 44—formerly issued by the U. S. Weather Bureau have come to their close.

Contributions to meteorology such as would have formed bulletins are authorized to appear hereafter as Supplements to the MONTHLY WEATHER REVIEW. (Memorandum from the Office of the Assistant Secretary, May 18, 1914.)

These supplements will comprise those more voluminous studies which appear to form permanent contributions to the science of meteorology and of weather forecasting, as well as important communications relating to the other activities of the U. S. Weather Bureau. They will appear at irregular intervals as occasion may demand, and will contain approximately 100 pages of text, charts, and other illustrations. Copies may be procured at the prices indicated below by addressing the Superintendent of Documents, Government Printing Office, Washington, D. C.

SUPPLEMENTS PUBLISHED.

No. 1. Types of storms of the United States and their average movements. By E. H. Bowie and R. H. Weightman. Washington, 1914. 37 p. 114 ch. 4°. Price 25 cents.

No. 2. I. Calendar of the leafing, etc., of the common trees of the Eastern United States. By G. N. Lamb. 19 p. 4 figs. II. Phenological dates, etc., recorded by T. Mikesell at Wauseon, Ohio. By J. Warren Smith. 73 p. 2 figs. Washington, 1915. 4°. Price 25 cents.

No. 3. (Aerology No. 1.) Sounding balloon ascensions at Fort Omaha, Nebr., May 8, 1915, etc. By W. R. Blair and others. Washington, 1916. 67 p. 23 figs. 4°. Price 25 cents.

No. 4. Types of anticyclones of the United States and their average movements. By E. H. Bowie and R. H. Weightman. Washington, 1917. 25 p. 7 figs. 73 ch. 4°. Price 25 cents.

TYPES OF ANTICYCLONES OF THE UNITED STATES AND THEIR AVERAGE MOVEMENTS.

By EDWARD H. BOWIE and R. HANSON WEIGHTMAN.

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INTRODUCTION.

The meteorologists of the several nations are awake to the fact that a careful, systematic compilation and a scientific interpretation of the already available observations of the speed and direction of the winds and clouds and the changes in temperature, pressure, the amount of water vapor, and possibly other elements before, during, and after the formation of cyclones and anticyclones are essential before the moot questions concerning their nature may be stated in laws that will be subscribed to generally. A cursory reading of the literature on the subject, new and old, will disclose a disinclination on the part of many meteorologists to accept any one of the hypotheses that have been put forth to account for the origin of cyclones and anticyclones. Much work of a statistical nature therefore yet remains to be done before authorative, and not speculative, statements may be made concerning the underlying laws that bring about and control the major atmospheric phenomena that are portrayed on the daily weather maps. One of the ultimate objects of this work will be the improvement of weather forecasting, which already has a prominent place in the commerce, agriculture, and life of the world.

In the Weather Bureau there was early recognition of the necessity for a systematic compilation of observational data and its subsequent scientific interpretation. Abbe, Garriott, Hazen, Henry, and others have published valuable papers on weather forecasting in the United States. There has recently come from the press a manual on "Weather Forecasting in the United States," a series of papers by the forecasters of the bureau, with contributions by Profs. Marvin and Humphreys.

That work is to a considerable extent empirical and statistical, and theories not proven are not given great space. Its paramount value will be found in the definite rules, empirical though they be, concerning the development and behavior of cyclones and anticyclones and isobaric configurations, together with their bearing on subsequent weather and storm conditions. Heretofore no manual of this kind has been available to a person desiring to study the art of weather forecasting in the United States. It is regrettably true that forecasters have been loath to write of the practical aids that have assisted them in becoming expert forecasters and much of the information thus gained during their assignments to forecast work has passed with them or else has been communicated by word of mouth. Prof. F. H. Bigelow during his connection with the Weather Bureau was a prodigious worker and left a considerable number of contributions to forecasting. Prof. W. R. Blair is doing excellent work in upper-air research and has recently published an excellent paper on the general circulation.[1] Upper-air research must, however, be conducted from a chain of stations, and not from a single station as at present, in order to gain comprehensive data from which to obtain a more thorough knowledge of upper-air conditions. An earlier paper by the present authors, "Types of Storms of the United States and Their Average Movements,"[2] employs a purely statistical method of handling cyclones and unquestionably will be helpful to beginners in the art of weather forecasting.

The present paper deals with the anticyclones of the United States along the same general lines followed in the paper just referred to. Beyond a statement of published views concerning the forces that originate, maintain, and propel anticyclones across the United States at a rate of speed that is little less than that of cyclones, no attempt will be made to deal at length with theories concerning their origin, etc. It is therefore largely statistical, with, however, brief descriptions of the types of anticyclones, their courses, and the resulting weather and temperature conditions.

[1] MONTHLY WEATHER REVIEW, April, 1916, 44: 186–196. Illustr.
[2] MONTHLY WEATHER REVIEW SUPPLEMENT No. 1, July, 1914.

AREAS OF HIGH BAROMETER OR ANTICYCLONES.

An examination of a brief series of synoptic weather charts will disclose a more or less orderly march of areas of low pressure (cyclones) and areas of high barometer (anticyclones) across the United States, each of which has a local system of winds peculiar to itself. It will be noticed that in the area occupied by the cyclone the surface winds flow around the center as incurving spirals in a direction contrary to the movement of the hands of a watch, face up; on the contrary, in the area occupied by the anticyclone the surface winds are directed away from the center in an outgoing spiral in a direction opposite to that in the cyclone. These local systems of high and low barometer, with their peculiar local wind systems, are carried forward by the general drift of the atmosphere that prevails within, in all probability, three to five miles of the surface of the earth. Moreover, it seems altogether probable that they may be considered as by-products of the general or primary circulation of the atmosphere.

Origin of cyclones.—There have been proposed a number of hypotheses concerning the origin of these all-important meteorological phenomena. As to the cyclones, the hypothesis of local thermal convection was for many years considered sufficient to account for their origin, but this has defects. It does not explain the great frequency of cyclones of the winter season in higher latitudes, when temperatures are low and solar insolation is at a minimum. It does not explain why during the summer season, when seemingly the factors of heat and moisture are abundant over the continents, the cyclones are not at a maximum frequency. Nor does it explain why in the Tropics, during the summer season of the Northern Hemisphere, when the thermal equator is north of the geographic equator, cyclones or hurricanes develop there only occasionally instead of frequently, in view of the abundant heat and water vapor that must always be present. As a matter of fact, an entire season may pass without evidence of a hurricane or cyclone having formed in this region of excessive humidity and heat. Likewise, the temperature factor can not be the primary one that operates to build an area of high barometer or anticyclone. It has been shown by observations in the United States, made by means of kites and balloons, that there is no essential difference in temperature, disregarding surface conditions, in the regions within several kilometers immediately above the centers of cyclones and anticyclones.[3]

[3] The Bulletin of the Mount Weather Observatory, 1913, 6: 136-141, presents tables from which we get the following figures:

Height above sea level (in km.).	0.526	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00	3.25	3.50
Temperature well within HIGH (5-year mean) (°C.).	8.8	6.8	6.3	5.6	6.3	5.3	3.3	2.4	1.9	0.1	−1.2	−2.5	−3.8
Temperature well within LOW (°C.).	11.3	10.1	8.6	7.8	6.3	4.9	3.7	2.5	1.2	−0.2	−1.7	−3.1	−4.6
Difference (°C.)...	−2.5	−3.3	−2.3	−2.2	0.0	0.4	−0.6	−0.1	0.7	0.3	0.5	0.6	0.8

According to these data, the difference in mean temperature of the air over a HIGH and that over a LOW is small by the time one gets to the height of 1 kilometer above the earth's surface. Above the 3.5-kilometer level the observations become fewer in number and they are not so well distributed, but the indications are that this temperature relation obtains up to the level of minimum temperature.—*W. R. Blair.*

The origin of LOWS is sometimes ascribed to eddies in the general wind system. If a stream of water flows into a quiet pond or two streams flow past or over each other in different directions eddies are often formed. Similarly eddies may be formed in the atmosphere. The counter-current hypothesis—which ascribes the formation of cyclones to gyrations set up by branches of the general circulation or to oppositely directed and horizontally flowing streams of air next above the immediate surface winds—seems more likely to fit the facts not only as observed on the daily weather charts but as shown by the upper-air observations as well. Toynbee [4] showed in a discussion of the meteorology of that part of the Atlantic Ocean north of latitude 30° N., during part of February, 1870, that "northerly winds to the westward of southerly are common forerunners of cyclonic movements [developments ?]." Blair [5] has pointed out that the front half of a cyclone is one where the upper currents have a northward component of motion and are relatively warm, and the rear half one, where the upper air currents have a southward component of motion and are relatively cold. He also has pointed out that in the front half of an anticyclone the upper air has a southward component of motion and is cold and the rear half a northward component of motion and is warm. In the counter-current theory it is these two streams of air that cause the formation of both cyclones and anticyclones. The deflective force of the earth's rotation and gravity, however, are important factors. The development of a cyclone within a trough of relatively low pressure that lies between two adjacent anticyclones is frequently revealed by the weather map. An example of this formation is shown on the small charts, figures 1 and 2 (maps of December 26 p.m., and 27 a.m., 1904).

It seems altogether probable that the counter currents to the east and west of this trough had much to do with the development of the cyclone that actually formed over the Mississippi Valley and moved northward and northeastward across the Great Lakes. The following remarks by Shaw [6] strongly point to the counter-current theory:

> It is curious, but undeniable, that when a westerly current has an easterly current upon its southern side, the two show no disposition to mix except possibly to produce fog; they keep an undisturbed anticyclonic region between them as a sort of buffer state. If the westerly current has an easterly current on its northern side, quite the opposite state of things results—the two currents engage one another forthwith, and a circular storm results. Doubtless the consequences are in accordance with the principles of circulation and its acceleration laid down by Prof. V. Bjerknes (MONTHLY WEATHER REVIEW, October, 1900), but to those unfamiliar with the reasonings of hydrodynamics they must seem rather mysterious.

Thus two such currents, one directed north and the other directed south, flowing past each other, tend to bank together and form an anticyclone center when the southward-flowing current is on the east and the north-

[4] *Toynbee, Capt. H.* A discussion of the meteorology of the part of the Atlantic Ocean lying north of 30° N., for the 11 days ending February 8, 1870. London, 1872. 164. p. 40. (Great Britain. Meteorological Office No. 13.)

[5] MONTHLY WEATHER REVIEW, April, 1916, 44:186, ffg.

[6] *Shaw, W. N.* Forecasting weather. London, 1911. 8°. p. 286.

DEVELOPMENT OF A CYCLONE IN A TROUGH.

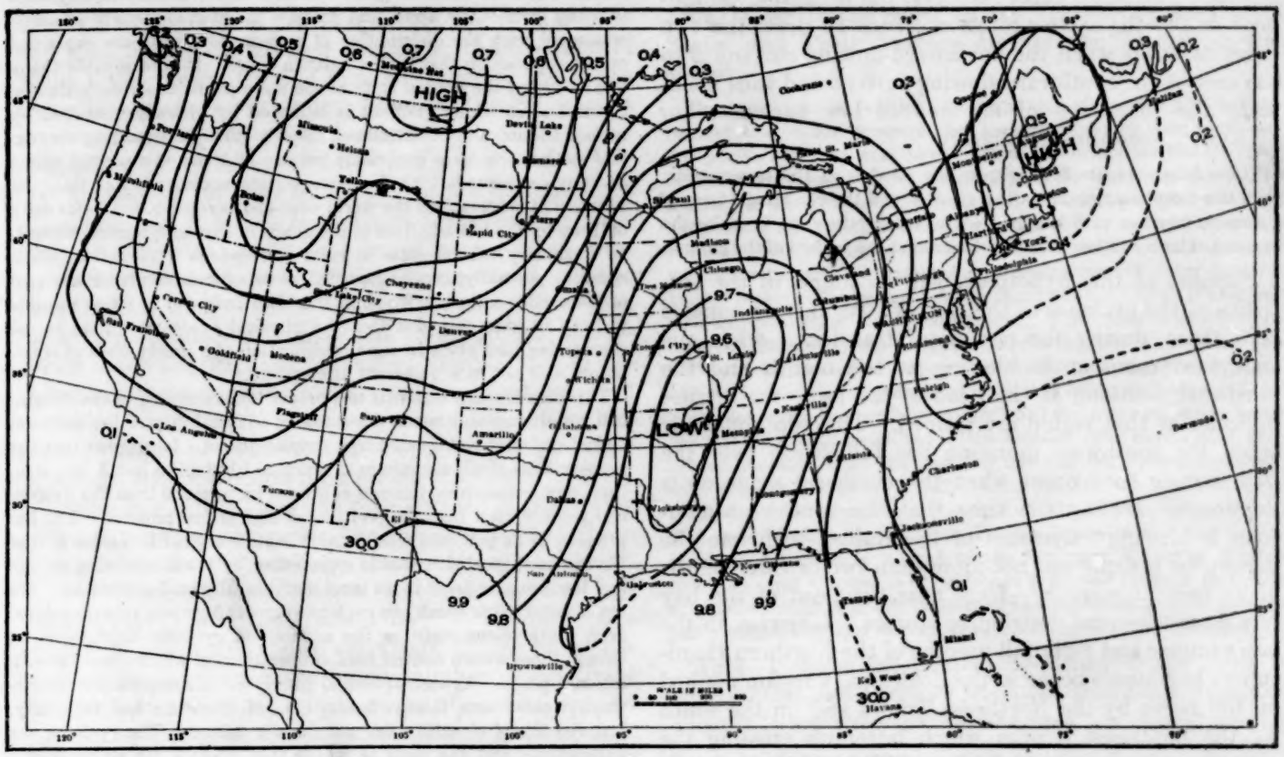

FIG. 1.—Isobars over the United States, December 26, 1904, 8 P (75th M. T.).

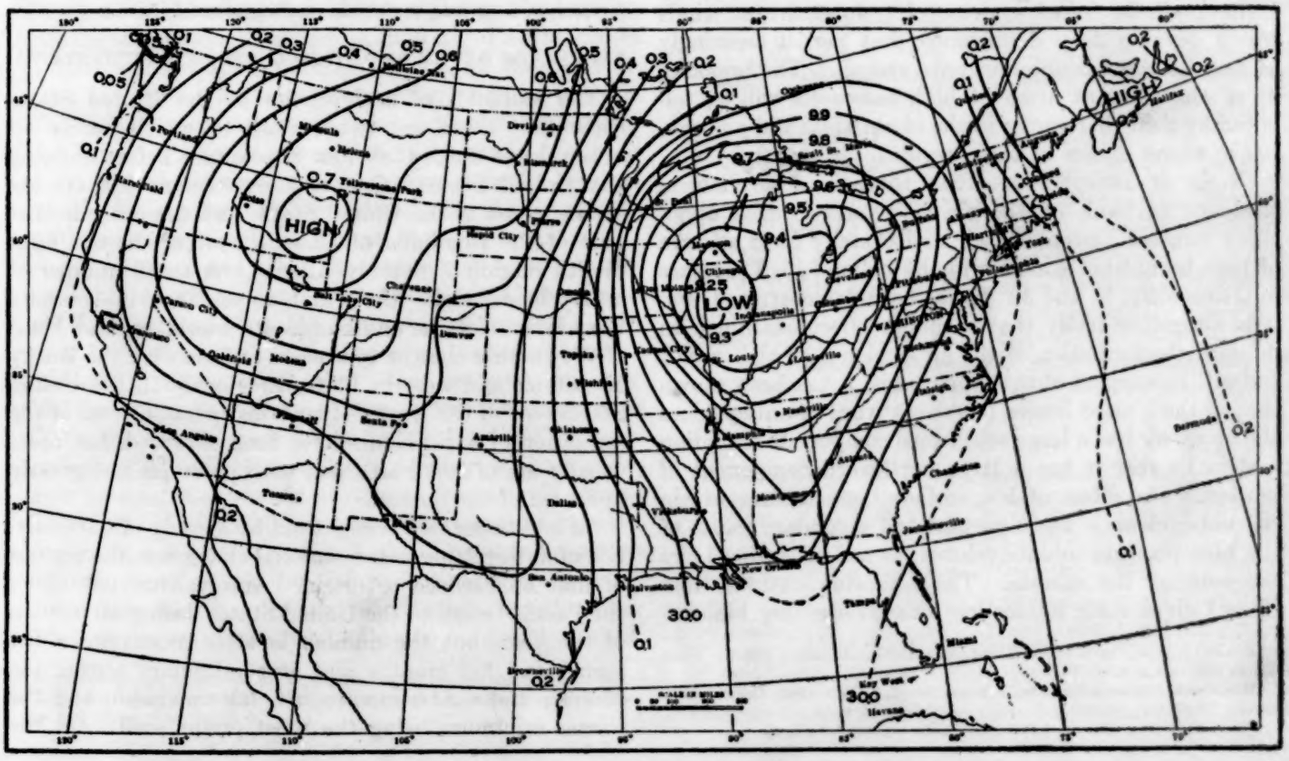

FIG. 2.—Isobars over the United States, December 27, 1904, 8 A (75th M. T.).

ward flowing current is on the west side of the neutral region. The same cause, namely, the deflecting component due to the earth's rotation, tends to draw the two currents apart when the northward-flowing current is to the east of the southward-flowing current and thus facilitates the formation of an area of low barometer or cyclone. According to Bigelow,[7]

> These long currents flowing past one another in the lower strata, with the component of the earth's rotation and the centrifugal force of gyration, together with the gradient of temperature, go to make the systems of high and low pressure observed at the surface of the ground.

Support of this hypothesis will be found in the statistics of the cyclones of the Bay of Bengal.[8] It appears that there, during the periods of transition—when the southwest monsoon is blowing at the mouth and the northeast monsoon at the head of the bay—the intense cyclones of that region are formed. They do not occur when the southwest monsoon has full sweep over the bay, nor do they occur when the northeast monsoon is dominant. During the time that the southwest monsoon is blowing "Cyclones of the Rains"—wherein the barometer is depressed not more than two or three tenths of an inch of mercury—form near the head of the bay but do not become destructive storms. Likewise, in the late summer and early fall months of the Northern Hemisphere hurricanes occur in the doldrums, a region flanked on the north by the Northeast Trades and on the south by the Southeast Trades which latter on crossing the equator and passing to an appreciable north latitude are deflected to the right and become southwest winds. Similarly in the region of the Aleutian Islands and of Iceland will be found systems of countercurrent winds which develop deep depressions that persist seemingly as long as these countercurrents prevail. The breaking up of the adjacent areas of high barometer will be followed by rising barometer in the storm areas and a lessening of storm action in these regions.

Origin of anticyclones.—That there is a mechanical tendency to bank up the air between two such oppositely directed currents of air and thereby form an area of high barometer is shown in the belts of high pressure in latitude 30° N. and 30° S. has been demonstrated, and it is altogether likely that a similar effect has much to do with the formation of the anticyclones of higher latitudes. In support of this hypothesis, it has been shown that in the United States to the eastward of anticyclones the upper air has a large southward component of motion and in its rear it has a large northward component of motion. The effect of low surface temperatures within the anticyclone is an important but secondary cause of the high pressure in anticyclones, as not all anticyclones are cold at the surface. The following extract from Shaw [9] gives some interesting ideas concerning highs.

> We find when we consider the air at some distance above the surface that the balance between gradient and velocity is very closely kept in many parts of the world, and many of the most obvious phenomena connected with the distribution of pressure and wind are explained on the supposition that such a balance exists. It is reasonable therefore to regard the normal state of the atmosphere as a steady state of circulation in which gradient is balanced by velocity disturbed by surface friction and other causes. This method of regarding the normal state is the more reasonable because it gives us a normal which actually corresponds with the average state as derived from the combination of observations the world over and is represented in its main outlines by the isobaric lines of the charts of average pressure, whereas an imaginary normal state of calm corresponds with nothing that, speaking generally, can be regarded as an average result for any part of the earth's surface. We shall therefore endeavor as far as possible to keep in view the idea that the physical processes which we are considering take place in some modification of a steady state of circulation, and not in a quiescent atmosphere.
>
> This idea is really essential to a proper understanding of the dynamical conditions, and hence the stability or instability of the meteorological situation represented by synoptic charts. It suggests that the great streams of air, sometimes as much as 1,000 miles broad, are, from their own momentum, features of greater importance from the dynamical point of view than the positions of high or low pressure. The impression to be gathered from current meteorological literature is that the meteorological situation is represented by the meandering of high and low pressure areas in an inert medium, the undisturbed air. We are accustomed to speak of a cyclone encroaching upon an anticyclone, or an anticyclone resisting the advance of cyclonic depressions, as though there were a neutral field of operations in which these encounters take place. As a metaphorical description of a sequence of meteorological conditions, this particular form of literature had its utility, but the limits of utility are very easily passed. The cyclone, the anticyclone, and the areas in which they operate are all parts of a single general circulation of currents. *An anticyclone is maintained by the currents which circulate round it. If they fail the high pressure disappears, and similarly it is not possible often to say whether a center of low pressure is the cause or the consequence of a westerly current of wind.*

REGIONS OF ORIGIN OF ANTICYCLONES OF UNITED STATES.

The statistics of anticyclones of the United States show that there are two regions in which nearly all anticyclones make their first appearance before entering the United States. One of these regions lies off the Pacific coast of the United States and the other is that part of the Dominion of Canada west of the one hundredth meridian, notably Alberta. A small number of anticyclones make their first appearance in southern Canada, east of the one hundredth meridian, and highs of yet another class or type seem to form over the Rocky Mountains and western Plateau regions. In the United States east of the Rocky Mountains sporadic cases of the formation of anticyclones have been observed, but these usually are of small area and with pressures not greatly in excess of the normal.

An additional fact brought out by a study of the statistics of anticyclones is the seasonal changes in the regions of first appearance or origin. Anticyclones pass from the Pacific Ocean to the United States during all months of the year, but the number is at a maximum in the spring and fall months and at a minimum during the summer and winter months, the fall maximum and the winter minimum being the most pronounced. On the

[7] *Bigelow, F. H.*, in Annual Report of the Chief of the Weather Bureau, 1898–99. Washington, 1900. vol. 2, p. 448.

[8] Hand-Book of cyclonic storms in the Bay of Bengal, by John Eliot. Calcutta, 1890. xxix, 8, 212 p. 8°.

[9] *Shaw, W. Napier.* Op. cit., p. 142–144. (Italics are ours.—*Authors.*)

other hand the number of anticyclones that make their first appearance over southern Canada west of the one hundredth meridian is greatest during the cold months and least during the summer months. An inspection of Table 1 also shows that the preponderance of the HIGHS from Alberta over the HIGHS from the Pacific is at a maximum during the winter season.

As the characteristics of anticyclones that make their first appearance off the Pacific coast of the United States are essentially different from those pertaining to anticyclones that make their first appearance over western or southern Canada, and these again are found to differ from HIGHS arising over the Rocky Mountains, it has been found practicable and convenient to group our anticyclones according to their regions of origin. Before deciding on these regions, maps were prepared for each month of the year on which was entered a dot for the point of origin of each HIGH as shown by the MONTHLY WEATHER REVIEW charts for a period of 15 years. Thus, following in a general way the plan pursued in classifying cyclones in our earlier paper, the anticyclones have been arranged in the "types" or classes known as North Pacific, South Pacific, Alberta, Rocky Mountains and Plateau region, and the Hudson Bay.[10] The respective regions of origin are shown on Chart 1. No effort has been made to classify the small number of relatively unimportant anticyclones that make their first appearance in the United States east of the Rocky Mountains.

The cause of the prevalence of any one of the types of anticyclones at any time of the year must be assigned to changes in the general or primary circulation of winds of the Northern Hemisphere. This unquestionably has to do with the seasonal changes in number of anticyclones of marine and continental origin, but in addition thereto there are times when one or the other of these types is at a maximum or minimum independent of the season. The cause of this is not understood, but it has been observed that the variations in pressure over the Alaskan area, including the Aleutian Islands, are closely related to these changes. Thus it has been observed in the winter season that, when the pressure is low over the Alaskan area, anticyclones from the Pacific Ocean are of greater frequency than the averages call for and at the same time the number making their appearance over southern Canada falls below the seasonal average. Conversely, in the winter season, when the pressure is above the normal over the Alaskan area, anticyclones from the Pacific Ocean are few in number, whereas those from southern Canada are of marked frequency. Charts 2 and 3 show in a striking way the changes in "types" that occur at times when the Alaskan pressures are above and below the normal for the given time of the year.

Not only does the pressure distribution over the Alaskan area have a pronounced influence on the "types" of anticyclones, but it also has a marked influence on the courses of cyclones of the United States. This fact was brought out in the paper on the "Storms of the United States and Their Average Movements," where it was stated:[11]

> The variations in position and magnitude of the elongated subpermanent area of low pressure that normally extends from southeastern Alaska to Kamchatka have a decided influence on the character of and courses followed by storms (cyclones) that cross the United States. If this Aleutian LOW is north of its normal position, LOWS will move along our northern border; whereas, if it is south of its normal position, LOWS will move far south of their normal tracks and stormy weather with great alternations in temperature will occur over the United States. The paths of storms that cross the United States shift with the position of the Aleutian LOW. When after a period of indifferent pressure within the Aleutian area the pressure in this region begins to fall, a LOW will appear within 36 hours north of Montana, and, as the Aleutian LOW deepens, LOWS will follow each other in rapid succession along the northern border until the pressure begins to rise north of the Aleutian area and it (the Aleutian LOW) moves south of its normal position, when the tracks of LOWS in the United States will shift to lower latitudes. Finally, when the Aleutian LOW reaches its southernmost position, LOWS crossing the United States will make their first appearance in the southern Plateau region or over the Gulf of Mexico. Attention is invited to the MONTHLY WEATHER REVIEW charts showing the tracks of centers of low areas for each month for additional evidence of this interesting and important relation between the Aleutian LOW and the tracks of storms in the United States.

Table 1 shows the relative frequency of the types of anticyclones and cyclones when the pressure is high and when it is low over the Alaskan area.

TABLE 1.—*Relative summer and winter frequencies of the various "types" of anticyclones and cyclones under conditions of high and of low pressure over Alaska (1911–1916, inclusive).*

Highs.	Summer. (June, July, August.)						Highs.	Winter. (December, January, February.)					
	Alaska high.			Alaska low.				Alaska high.			Alaska low.		
	Number.	Per cent.	Excess.	Number.	Per cent.	Excess.		Number.	Per cent.	Excess.	Number.	Per cent.	Excess.
North Pacific	5½	34.4	.....	10½	65.6	31.2	North Pacific	2	12.9	.....	13½	87.1	74.2
South Pacific	0	0.0	.....	0	0.0	....	South Pacific	3	35.3	.....	5½	64.7	29.4
Alberta	26½	73.6	47.2	9½	26.4	....	Alberta	48½	82.2	64.4	10½	17.8	....
Plateau and Rocky Mountains region	6	66.7	33.3	3	33.3	....	Plateau and Rocky Mountains region	6½	65.0	30.0	3½	35.0	....
Hudson Bay	3	60.0	20.0	2	40.0	....	Hudson Bay	7	50.0	.....	7	50.0	....
Total	41	.....	.....	25	.....	.....	Total	67	.....	.....	40	.....	.....
Lows.	Alaska high.			Alaska low.			Lows.	Alaska high.			Alaska low.		
	Number.	Per cent.	Excess.	Number.	Per cent.	Excess.		Number.	Per cent.	Excess.	Number.	Per cent.	Excess.
North Pacific	1	100.0	100	0	0.0	.....	North Pacific	20	64.5	29.0	11	35.5	....
South Pacific	1	100.0	100	0	0.0	.....	South Pacific	4	100.0	100	0	0.0	....
Alberta	18	48.6	.....	19	51.4	2.8	Alberta	12	24.7	.....	36½	75.3	50.6
Northern Rocky Mountains region	10½	70.0	40.0	4½	30.0	....	Northern Rocky Mountains region	4½	45.0	.....	5½	55.0	10.0
Colorado	9½	51.4	2.8	9	48.6	....	Colorado	7½	37.5	.....	12½	62.5	25.0
Texas	2	36.4	.....	3½	63.6	27.2	Texas	6	28.6	.....	15	71.4	42.8
East Gulf	1	100.0	100	0	0.0	....	East Gulf	1	50.0	.....	1	50.0	....
South Atlantic	2	66.7	33.3	1	33.3	....	South Atlantic	3	60.0	20.0	2	40.0	....
Central	2	100.0	100	0	0.0	....	Central	1	50.0	.....	1	50.0	....
Total	47	.....	.....	38	.....	.....	Total	59	.....	.....	84½	.....	.....

[10] These titles are in common use at the Washington office of the Weather Bureau. They refer to divisions of North America *only*, and have been abbreviated by omitting the word "States" or "Province."

[11] MONTHLY WEATHER REVIEW SUPPLEMENTS: No. 1, Washington, 1914. p. 4, col. 1.

The data in Table 1 cover the five years, June, 1911, to February, 1916, inclusive, the summer being represented by the months of June, July, and August, while December, January, and February stand as typical of the winter season. When pressure conditions over the Alaskan area were indifferent and there was any doubt as to whether pressure conditions there should be classed as above or below normal, the HIGH or LOW under consideration was omitted from the compilation. When a HIGH or LOW was on a boundary line between two type regions, one-half weight was given under each type. It is found that during the summer as well as during the winter season, with pressure high in the Alaskan area Alberta HIGHS were more numerous than those of Pacific origin. But with pressure low in Alaska just the reverse is true, Pacific HIGHS being more numerous. Again in summer there are found about three times as many Alberta HIGHS when pressure is high in Alaska compared to when it is low, and in the winter season nearly five times as many. The Pacific HIGHS show a decided preponderance when pressure is low in Alaska, rather than when it is high, in summer as well as in winter. The Plateau and Rocky Mountains Region HIGHS are about twice as frequent with high pressure over Alaska as they are with low pressure. Conditions over Alaska seem, from the table, to exercise only a very limited control over the types of cyclones during the summer. There were two Pacific LOWS with high pressure over Alaska, while none occurred with low pressure there. The Northern Rocky Mountains type shows about twice as many LOWS when pressure in Alaska is high compared to when it is low. During the winter season, however, we find more Alberta than Pacific LOWS when pressure in Alaska is low, and when pressure in Alaska is high we get an excess of the Pacific over the Alberta LOWS. The Colorado and Texas types are more frequent when pressure in Alaska is low, and undoubtedly for the reason that a majority of such LOWS are trough phenomena and would therefore be more frequent at times when the Alberta type is at a maximum, namely, when Alaskan pressure is low.

NOTES ON TYPES OF ANTICYCLONES OF THE UNITED STATES.

The geographic divisions in which anticyclones of the United States make their first appearance, or originate, and from which the several types receive their designations, are shown on Chart 1. Thus the South Pacific type first appears over California or off the coast of that State. The North Pacific type first appears over Washington and Oregon or off the coast of these States. The Alberta type ordinarily makes its first appearance in southwestern Canada west of the ninety-fifth meridian. The Hudson Bay type first makes its appearance in southern Canada east of the ninety-fifth meridian or over the region of the Great Lakes. The Rocky Mountains and Plateau Region type makes its first appearance over one or the other of these regions. The aggregate number of each of the several types for each month for the period 1892 to 1912, inclusive, is shown by Table 2, p. 12, while the average 24-hour movements for each type, by months, are shown by Table 3, p. 12, and figure 3.

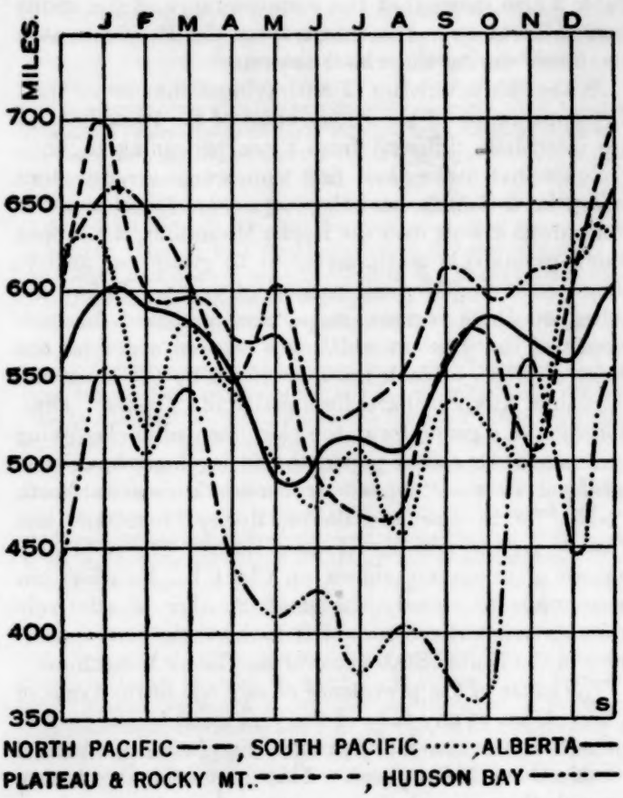

FIG. 3.—Monthly march of the mean 24-hours movements of HIGHS across the United States, by types.

It is commonly known that anticyclones have a general eastward movement over the United States with a rate of speed that is generally less than that of cyclones; also that, while the cyclones generally move east by north, anticyclones move east by south. It is also a familiar fact that precipitation, more or less general cloudiness, and winds above ordinary velocities attend cyclones, while clear skies, low or relatively low surface temperatures, and winds of low force usually accompany anticyclones. This statement is generally true, but anticyclones are not always regions of clear skies and low temperatures, for it not infrequently occurs that they are accompanied by considerable cloudiness and more or less sporadic precipitation and at times, particularly in summer, occupy regions of extreme surface heat. In general cyclones are followed by anticyclones and these in turn by cyclones; but this is not necessarily true, for it not infrequently happens that two or more cyclones pass eastward without intervening anticyclones, and again it sometimes happens that several anticyclones will pass eastward without well-defined cyclones between them.

Anticyclones, like extra-tropical cyclones, attain their maximum frequency and speed of movement in the

winter months and are at their minimum in the summer months. It has been observed that any unusual activity in the general circulation of the atmosphere—as manifested by the Centers of Action—is followed by an increase in the frequency and speed of movement of cyclones and anticyclones. It would therefore seem to follow that these two phenomena are controlled by the primary circulation.

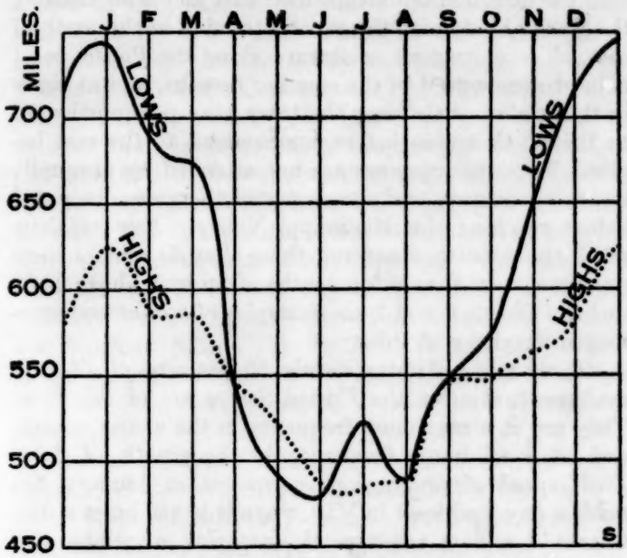

FIG. 4.—Monthly march of the mean 24-hours movements of HIGHS and LOWS across the United States, in general.

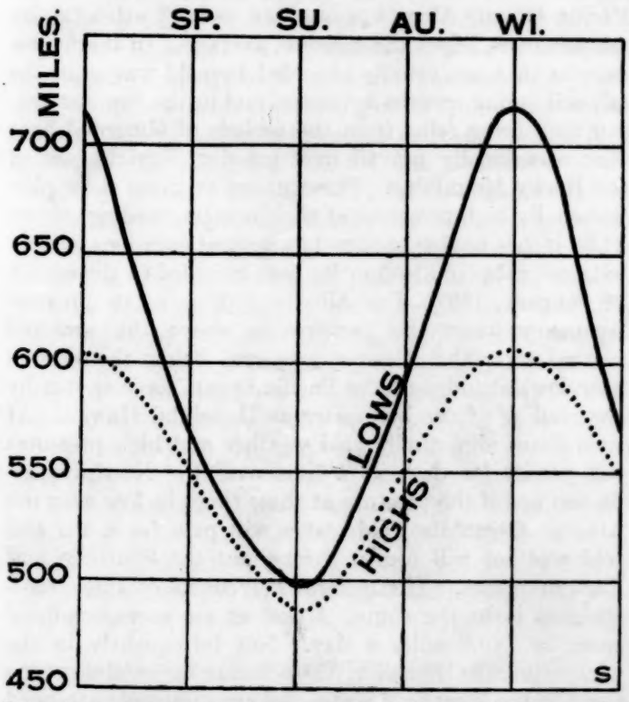

FIG. 5.—Seasonal march of mean 24-hours movements of HIGHS and LOWS across the United States, in general.

The average speed of movement for anticyclones of the United States, as shown by Table 3, is 544.3 miles in 24 hours, or 22.7 miles an hour. The speed of movement is greatest in January and least in July. Figures 4 and 5 show in a graphic manner the variations in speed of movement by months and by seasons. It will be noted in connection with figure 4 that cyclones move considerably faster than the anticyclones in winter and at approximately the same speed as anticyclones in the months from April to September, inclusive.

The frequency of anticyclones is greatest in January and least in June. Figures 6 and 7 present graphically the frequency of anticyclones, together with that of cyclones by months and by seasons.

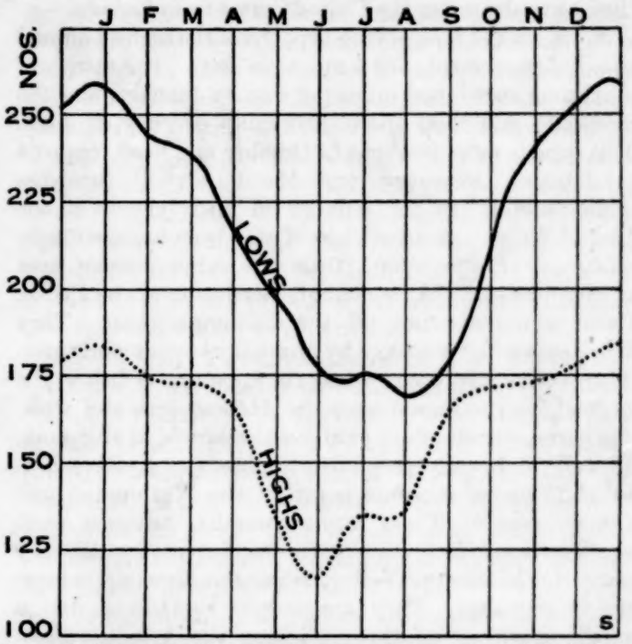

FIG. 6.—Monthly march of the numbers of HIGHS and LOWS that crossed the United States, 1892-1912. (See Table 2.)

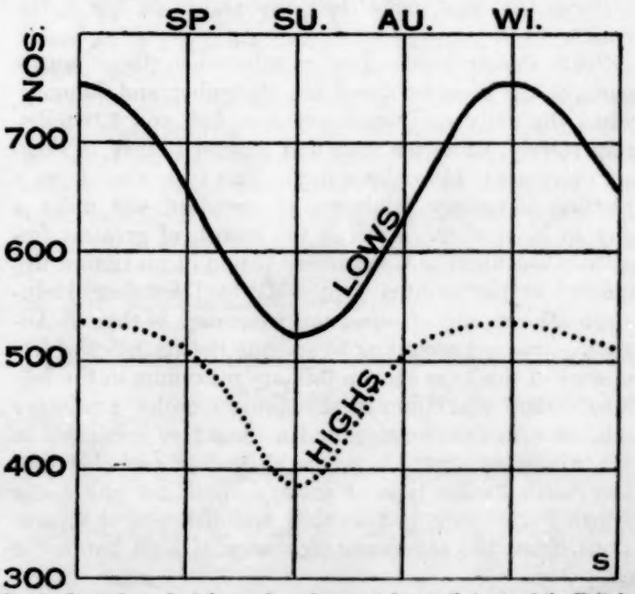

FIG. 7.—Seasonal march of the numbers of HIGHS and LOWS that crossed the United States, 1892-1912. (See Table 2.)

The direction of movement of the center of an anticyclone is usually toward that region within the area covered by it where the pressure is rising most rapidly. This is about the only rule that the forecaster heretofore has had to rely on in predicting the path of an anticyclone. As has been pointed out, the general distribution of pressure over the Alaskan area, i. e., whether above or below normal, seems to govern the types of anticyclones that cross the United States at the particular time. If the pressure in the Alaskan area is below the normal, anticyclones generally enter the United States from the Pacific Ocean; if above normal, they generally enter the United States from Canada.

North Pacific type.—This type gives the highest annual speed of movement, 562.5 miles per day. The month of maximum speed, 659 miles per day, is January, and the month of minimum speed, 480 miles per day, is June. This type is most frequent in October and least frequent in January, February, and March, and it furnishes approximately 20 per cent of all anticyclones of the United States. Anticyclones of this type are seemingly offshoots, or separations, from the subpermanent area of high pressure that commonly persists over the Pacific Ocean some distance off the California coast. They therefore are not attended by unusually low temperatures. They commonly occur when the pressure is below the normal for the season over the Alaskan area and when the barometer stands at or above the normal at Honolulu, Hawaii, and rarely pass inland unless the pressure rises to 30.25 inches at some point on the Washington and Oregon coasts. These HIGHS usually advance east-southeastward from the north Pacific coast until they cross the Mississippi Valley, when the direction is more nearly due east. They are usually short-lived, but a small percentage of them reaching the Atlantic coast. Charts 4 and 5 are examples of winter and summer anticyclones that first make their appearance off the North Pacific coast.

South Pacific type.—The months when these HIGHS move at the greatest speed are December and January, when the daily movement averages 623 and 628 miles, respectively, while the month of August is that of slowest movement, 458 miles a day. This type also shows a peculiar secondary minimum of speed of 498 miles a day in November. April is the month of greatest frequency and there is a secondary period of maximum frequency in the months September to December, inclusive. The month of minimum frequency is that of August. Grouped according to seasons the statistics of frequency of this type show a primary maximum in the fall, a secondary maximum in the spring months, a primary minimum in the summer, and a secondary minimum in the winter months. It seems altogether probable that the South Pacific type of anticyclone is not unlike the North Pacific type in that they are offshoots, or separations, from the semipermanent area of high barometer that usually prevails off the California coast, but with this difference, i. e., they appear when the position of the center of this semipermanent high is south of its normal position. Pressure below the normal over the Alaskan area is nearly always in evidence at the times that these anticyclones approach the California coast. The movement of the centers of the anticyclones is first toward the north or northeast along the coast, but after passing inland the direction of movement is east and after crossing the Rocky Mountains the general trend is to the south of east. The movement northward along the Pacific coast is most pronounced in the summer months, and at times in this season of the year the track may pass northward to British Columbia before a movement to the east begins. These anticyclones are not attended by unusually low temperatures, and a majority of them are dissipated before reaching the Mississippi Valley. Few of them reach the Atlantic coast and those that do seldom show pressures more than a few tenths of an inch above 30.00 inches. Charts 6 and 7 are examples of winter and summer anticyclones of this type.

Alberta type.—Approximately 50 per cent of all anticyclones that cross the United States are of this type. They are at a maximum frequency in the winter months and at a minimum frequency in the month of June. Their speed of progression is greatest in January, 601 miles a day, and least in May, when it is 489 miles a day. Charts 8 and 9 are typical examples of winter and summer HIGHS that make their first appearance over Alberta. Unlike the HIGHS that pass inland from the Pacific Ocean, Alberta HIGHS are usually attended by temperatures below the seasonal average. In the winter months they are usually attended by cold waves, in the fall and spring months by frosts, and in the summer season they bring relief from the periods of abnormal heat that occasionally prevail over interior districts east of the Rocky Mountains. These HIGHS at times show phenomenally high pressures at their centers, readings above 31.00 inches having occurred on several occasions, and an extreme value of 31.50 inches was recorded in the month of January, 1897. The Alberta type is at its greatest frequency when the pressure is above the seasonal normal over the Alaskan area and below the normal over low latitudes of the Pacific Ocean, as is shown by the reading of the barometer at Honolulu, Hawaii. At such times abnormally cold weather and high pressures will persist for days at a time over the Northwestern States, and if the pressure at these times be low over the Atlantic Ocean the cold waves will pass far south and cold weather will persist throughout the Southern and Eastern States. The general movement of these anticyclones is to the south of east at an average annual speed of 549.6 miles a day. Not infrequently in the winter months, however, these HIGHS move almost due south to the West Gulf States and are commonly attended by pronounced cold waves and "northers."

Plateau and Rocky Mountains region type.—This type reaches a maximum frequency in January and it is at a minimum frequency in May. It is exceeded in frequency only by those of Alberta and North Pacific origin, and by the North Pacific type in rapidity of movement. Its maximum speed of movement, 699 miles a day, is in January, and its minimum speed of movement, 469 miles a day, is in July. Charts 10 and 11 are typical of HIGHS of this class in the winter and summer months. The tendency is for anticyclones of this type to move southeastward over the Rocky Mountain region and the Plains States and eastward over the Mississippi Valley to the Atlantic coast. The tracks do not follow a restricted belt, however—they may sweep southward to the Gulf States, pass eastward through the central Mississippi and Ohio Valleys, or travel along the northern border. Low temperatures usually attend them while over the Plateau and Rocky Mountain regions and, if they are well developed and have a strong southward component of motion, they cause well-defined cold waves in the Southern States. In the late fall and early winter months there is a tendency for them to persist for several days over the elevated region west of the Rocky Mountain divide.

Hudson Bay type.—The smallest number of HIGHS of any one of the recognized classes is of this type, and its speed of movement is approximately 100 miles a day less than that of any other type. The average speed of movement of this type is 450.6 miles a day. It reaches its maximum speed, 560 miles a day, in the month of November and its minimum speed, 359 miles a day, in October. It occurs most frequently in the month of May and least frequently in November. The southward component of movement is pronounced in the average tracks of this type of anticyclone, some of them passing from the region north of the Great Lakes southward to the East Gulf States. They are attended by changes to much colder weather and occasionally by cold waves in the region of the Great Lakes and the Northeastern States in the winter months. At times, particularly in the spring months, these HIGHS persist for several days, gradually enlarging, over the Great Lakes or the St. Lawrence Valley, and at such times they exert a pronounced retarding effect on storms that would otherwise move rapidly eastward from the Plains States and the Mississippi Valley. Charts 12 and 13 give winter and summer examples of this type.

No attempt will be made to discuss in detail individual types of the several classes of anticyclones. Abundant references to HIGHS and their attendant weather, temperature, and winds will be found in Weather Bureau Publication No. 583, Weather Forecasting in the United States.

NORMAL 24-HOUR MOVEMENT OF ANTICYCLONES.

Investigators have discussed types and movements of cyclones quite extensively, but a similar study of anticyclones evidently has not been deemed of equal importance. Bigelow[12] drew mean annual tracks of anticyclones and these, with the tracks plotted by Van Cleef,[13] are the only graphic representations of tracks of HIGHS crossing the United States which are known to the authors. Semenov,[14] Brounov, Van Bebber, and others, as the accompanying selected bibliography shows, have studied tracks of HIGHS across other portions of the globe; but those studies were based on short periods (3 to 4 years only) and therefore could not deduce averages comparable with those here presented, which are based on a record of 21 years. Bigelow's presentation of HIGHS gave only the general tracks for the year and did not attempt to classify them by types as to origin and seasons. Van Cleef gives the paths of greatest frequency, but concludes that a type based on the arrangement of the isobars (whether for a HIGH or a LOW) is a very illusive and unsatisfactory guide for forecasting. He did not attempt to classify according to origins. Semenov adopted seven types for the HIGHS he found crossing Europe (1889 to 1893), grouping together those that had similar paths, but paying no attention to season or origin. The classification used in the present paper considers both region of origin and season of occurrence.

A good deal of work has, however, been done in connection with the speed of movement of HIGHS by Thomas Russell,[15] Loomis,[16] Von Herrmann,[17] and others. None of these presentations serve as a guide for the forecaster, primarily because the tracks of all seasons have been thrown together to form a more or less meaningless average, with the result that any seasonal characteristics are entirely blotted out. Again HIGHS originating in certain regions have characteristics peculiar to that region and, if the HIGHS of all regions are considered together, their regional peculiarities are necessarily lost. A careful perusal of the section devoted to a description of the several types, pages 10 to 11, will reveal the vital importance of a seasonal and a regional separation of types in any discussion of anticyclones.

Table 2 gives the total number of HIGHS by types for each month and for the year and also the total number of HIGHS for each month and for the year. The total number of HIGHS used was 1,937. In comparing the total number of LOWS for the same period, which was 2,597, it is noted that there are about 75 per cent as

[12] *Bigelow, Frank H.* Storms, storm tracks, and weather forecasting. Washington, 1897. p. 11. (Weather Bureau bulletin No. 20. W. B. 114.)

[13] *Van Cleef, Eugene.* Is there a type of storm path? MONTHLY WEATHER REVIEW, March, 1908, 36:56-58, Charts xxxvi-35—xxxvi-44.

[14] *Semenov, I.* In Mémoires Acad. imp. sci., St. Petersbourg. 8 ser., v.11, no. 3, 1901.

[15] *Russell, Thomas.* Meteorology, weather, and methods of forecasting. New York, 1895. xxiii, 277 p., 22 pl.

[16] *Loomis, Elias.* Contributions to meteorology. [Chapters I, II, III.] Revised edition, New Haven, 1885, 1888, 1889. 4°. (Chapter II.—Areas of high pressure. . . . New Haven, 1888, pp. 69-142, Plates XVII-XXXII.) (*From* National Academy of Sciences, Memoirs, v. 4, no. 7, p. 7-77, plates XVII-XXXII.)

[17] *Von Herrmann, C. F.* Velocity of the centers of high and low pressure in the United States. MONTHLY WEATHER REVIEW, April, 1907, 35: 169-171. *Reprinted in* Bulletin of the Mount Weather Observatory, April, 1910, v. 2, pt. 4, pp. 196-202.

many HIGHS as LOWS, and not 50 per cent as many, as is given by some writers. In the bottom line of the table are given revised values, showing the number of HIGHS there would be provided the months were of equal length. The values are computed on the basis of a 30-day month.

TABLE 2.—*Monthly numbers of anticyclones of each type observed during the period, 1892–1912, inclusive.*

Type.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
North Pacific	17	17	18	34	28	34	28	39	44	58	43	23	383
South Pacific	13	10	15	34	11	13	7	4	21	20	19	25	192
Alberta	116	99	117	65	69	40	62	63	73	62	83	98	947
Plateau and Rocky Mountains region	36	26	19	21	14	19	26	19	15	26	23	28	272
Hudson Bay	8	12	10	13	18	11	16	16	12	12	5	10	143
Total (calendar months)	190	164	179	167	140	117	139	141	165	178	173	184	1,937
Total (by 30-day months)	184	174	173	167	135	117	135	136	165	172	173	178	1,909

Table 3 gives for each of the five types of HIGHS the average daily movement in miles (as found by taking the distance in a straight line from the center of the HIGH at one observation to its center 24 hours later) for each month of the year, and immediately below in italics the number of observations on which the average is based. The figures in italics are not an exact representation of the number of HIGHS observed within the square for the reason that, when a HIGH was on a dividing line between two 5-degree squares, the data were entered in both squares, there being no good reason for giving the value to one square and not to the other. The values as given are therefore too high. A trial was made to ascertain whether or not the giving of such observations half weight in each of the two squares would alter the vector values as obtained by giving them full weight, but practically no difference was shown. The observations were therefore worked up, giving full weight in such cases. The average 24-hour straight-line movement is shown to be 544.3 miles, as against 602.4 for the LOWS, a difference in favor of the LOWS of about 58 miles a day.

As before stated, there has been little written and few data have been published concerning the normal or average tracks of areas of high pressure, or anticyclones, of the United States, and necessarily all forecasters have been more or less handicapped because of the lack of this information. It would appear necessary, to anyone with but a limited knowledge of the weather map, that normal 24-hour movements of areas of high and of low pressure for any given locality are essential in weather predicting. Experienced forecasters have necessarily a general knowledge of the speed of movement of HIGHS, but the novice gains this after long use of the weather maps, and then but imperfectly. To furnish this information has been the primary object of this publication.

There will be found in Tables 4 to 15, inclusive, the average 24-hour movement of each type of area of high pressure, by months, for each 5-degree square, based on the records of all anticyclones that were observed in the respective squares during the years 1892 to 1912. These tables contain the following data: (1) The number of centers of anticyclones observed within the square at 8 a. m. or 8 p. m., seventy-fifth meridian time; (2) the average azimuth of the position of all HIGHS or anticyclones, 24 hours after being observed within the 5-degree square, in degrees, reckoned from the north as zero through east, e. g., an entry of 105° means that the average position of anticyclones at the end of 24 hours is on a line bearing 15° south of east from the center of the square; and (3) the average 24-hour movement in miles (in a direct line—center to center) of all HIGHS of the given type which were observed within the 5-degree square. These data are graphically shown on Charts 14 to 73, and they visualize the general movement of HIGHS across the United States. Superposed on the vectors of 24-hour movements will be found a continuous line representing the successive average latitudes of the several types during their passage across the United States, but as few HIGHS actually follow this average path it is of

TABLE 3.—*Approximate average 24-hour movement, in miles, of each type of anticyclone during the period 1892–1912, inclusive, and the number of observations of each.*

Type.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Average.
North Pacific:													
24-hour movement (miles)	659	648	607	543	603	480	482	498	561	547	558	564	562.5
Number of observations	*119*	*162*	*177*	*403*	*348*	*496*	*357*	*440*	*569*	*704*	*536*	*220*	*4,530*
South Pacific:													
24-hour movement	628	517	582	542	497	472	508	458	535	518	498	623	531.6
Number of observations	*99*	*87*	*147*	*420*	*191*	*209*	*79*	*90*	*285*	*256*	*221*	*210*	*2,294*
Alberta:													
24-hour movement	601	590	581	551	489	501	511	504	552	585	570	560	549.6
Number of observations	*774*	*755*	*937*	*457*	*589*	*360*	*458*	*647*	*808*	*639*	*883*	*977*	*8,284*
Plateau and Rocky Mountain Region:													
24-hour movement	699	595	599	576	575	490	469	471	566	565	503	600	558.2
Number of observations	*201*	*152*	*159*	*156*	*104*	*185*	*230*	*208*	*161*	*259*	*197*	*180*	*2,187*
Hudson Bay:													
24-hour movement	553	503	541	445	410	424	379	407	381	359	560	445	450.6
Number of observations	*19*	*63*	*41*	*62*	*86*	*77*	*112*	*123*	*91*	*103*	*24*	*62*	*863*
Mean 24-hour movement	**624.2**	**588.4**	**584.9**	**544.6**	**521.4**	**484.0**	**482.8**	**487.0**	**544.6**	**548.0**	**561.6**	**569.6**	**544.3**
Total number of observations	*1,218*	*1,219*	*1,461*	*1,498*	*1,318*	*1,326*	*1,236*	*1,503*	*1,914*	*1,961*	*1,861*	*1,649*	*18,168*

greater importance that the forecaster have a knowledge of the movement of a HIGH of any given type no matter where it may be charted. This information is supplied by the 24-hour movement vectors. The figures at the center of each square indicate the number of observations in any given square upon which the direction and length of the vectors are based. The length of each vector is proportional to the number of miles of movement as defined above, its direction being indicated by the arrow. The absence of a vector in any given square indicates that no high center of the given type has been observed within the square either at 8 a. m. or 8 p. m. (seventy-fifth meridian time) during the period 1892 to 1912. The application of the data to day-to-day weather forecasting seems obvious. To illustrate the use of the normals: Assume that the HIGH on the weather map under consideration is of the Alberta type for January (*see* Chart 16) and that its crest is in the center of the square bounded by the meridians of 105° and 110° W. and by the parallels of 45° and 50° N. If the HIGH follow a normal course its center 24 hours later will be in approximately longitude 96° W. and latitude 41° N. Should the HIGH not follow the normal exactly, then for subsequent maps due allowance must be made for its departure therefrom, both in speed of movement and in direction of progress.

A SELECTED LIST OF REFERENCES ON THE MOVEMENTS OF ANTICYCLONES OF THE UNITED STATES AND FOREIGN COUNTRIES.

By ELEANOR BUYNITZKY, Assistant.

(Library, U. S. Weather Bureau, Nov. 17, 1916.)

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With charts showing tracks of HIGHS for the four seasons.

Die Untersuchungen von Elias Loomis über die Form, Ausdehnung und Fortpflanzung der barometrischen Maxima, sowie über die Beziehung der Maxima und Minima. (Annalen d. Hydrog., Berlin, 1887, v. 15, p. 355–365.)

Bebber, W[ilhelm] J[akob] van, & Köppen, W[ladimir]. Die Isobarentypen des Nordatlantischen Ozeans und Westeuropas und ihre Beziehungen zur Lage und Bewegung der barometrischen Maxima und Minima. Hamburg. 1895. 27 p. 23 pl. (Aus dem Archiv d. Deutschen Seewarte, **18** Jahrg., No. 4.)

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Bigelow, Frank H. Storms, storm tracks, and weather forecasting. Washington. 1897. 87 p. (U. S. Weather bureau. Bulletin 20.)
Chart 2 (p. 11) gives mean tracks of HIGHS and LOWS in the United States.

Brounov, P. Die Anticyclonen in Europa. Sanktpeterburg. 1886. 23 p. 16 pl. (H. Wild, Reportorium f. Meteorologie, herausg. v d. k. Akad. d. Wissenschaften, Bd. **10**, No. 8.)
Charts 1–12 give anticyclone tracks (1876–1879) for each month of the year.

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See also entry under **Berg, Fr.**

Garriott, E[dward] B. High areas of the North Pacific coast in September, October, and November. [With charts showing average paths of high and low pressure areas.] (U. S. Weather bureau. Studies of weather types and storms, no. 7. Washington. 1895. W. B. no. 63.)
Also published in the Monthly weather review, July, 1895, v. 23, p. 249–250, & charts vi–viii.

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Hepworth, M. W. Campbell. The tracks of ocean wind systems in transit over Australasia. (Quart. jour., Roy. meteor. soc., 1893, **19**: 34–38, & plate iv.)
With maps showing approximate positions of the centers of high and low pressure for four winter months and five summer months, respectively.

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Plate xxiv shows "movement of centers of high pressure over the United States."

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Gives a list of charts selected by the author as typical of what he found on a large number of meteorological charts for all parts of the globe which are on file in the Library of the Royal Meteorological Society.

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Includes HIGHS as well as LOWS. Chart xiii shows apparent types of paths of centers of high pressure.

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TABLE 4.—*Numbers, direction, and speed of movement of January anticyclones*

Longitudes west of Greenwich.	130–125			125–120			120–115			115–110			110–105			105–100			100–95		
Type and north latitudes.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.
North Pacific:																					
55–50				5	131	780	3	119	850	3	110	600	1	107	200	1	152	1,050			
50–45				12	99	596	12	119	608	2	112	750	3	138	725	1	126	1,000			
45–40				4	81	762	4	115	762	8	122	578	9	109	806	4	115	800	2	124	800
40–35										2	127	600	4	81	188	2	78	675	7	87	757
35–30																			3	85	783
30–25																					
South Pacific:																					
55–50																					
50–45				2	78	450	2	80	525	2	122	725	1	141	800	1	127	1,150			
45–40				5	75	660	10	82	486	8	141	350	4	114	788	2	88	925	1	107	750
40–35				12	70	679	10	74	520	8	118	256	4	92	850	4	95	925	2	91	600
35–30				1	63	700										1	79	750	3	86	767
30–25																					
Alberta:																					
55–50							23	103	570	58	109	519	68	116	618	53	116	659	31	116	740
50–45							1	75	600	4	103	538	23	123	702	38	122	679	45	117	693
45–40										2	165	400	4	137	675	13	125	635	31	116	627
40–35													2		000				14	105	614
35–30																2	72	850	3	83	600
30–25																			4	68	838
Plateau and Rocky Mountains Region:																					
55–50																					
50–45							1	117	950	5	104	900	3	79	1,020				1	110	850
45–40							7	107	750	13	121	665	13	113	546	8	109	625	7	90	800
40–35										7	104	436	15	107	713	12	109	871	12	100	692
35–30										1	50	500	1	75	1,200	5	92	710	8	80	825
30–25																			3	72	867
Hudson Bay:																					
55–50																					
50–45																					
45–40																					
40–35																					
35–30																					
30–25																					

TABLE 5.—*Numbers, direction, and speed of movement of February anticyclones*

North Pacific:																					
55–50				1	89	950	1	89	950				1	78	500	1	138	400	2	161	650
50–45	4	97	662	12	99	675	11	106	777	3	100	750	2	124	500	5	121	424	7	115	721
45–40	3	76	600	6	94	542	8	106	631	17	100	594	7	99	807	3	75	700	5	101	750
40–35										2	130	275	2	132	475	3	79	583	6	90	758
35–30																2	104	550	4	94	475
30–25																			2	72	1,075
South Pacific:																					
55–50																					
50–45				2	136	425	5	98	470	2	72	950									
45–40	4	27	212	9	92	322	17	94	241	8	116	588	3	116	717						
40–35				10	41	575	1	84	600	3	122	883	5	116	1,010	4	114	775	3	87	650
35–30							1	−4	300										2	74	675
30–25																			1	88	900
Alberta:																					
55–50				3	101	800	18	107	556	60	122	495	66	124	558	38	116	668	36	120	556
50–45										13	125	596	35	128	603	52	127	581	52	115	608
45–40										2	93	600	8	149	538	16	134	672	27	111	685
40–35							3	107	300	4	113	350	6	161	308	8	128	550	14	109	650
35–30													2	34	650	3	99	683	8	108	512
30–25																			6	59	475
Plateau and Rocky Mountains Region:																					
55–50																					
50–45										3	146	383	2	113	700				1	78	850
45–40							5	73	530	11	129	427	9	97	533	12	101	517	6	99	583
40–35							1	48	450				7	108	450	13	105	700	12	86	750
35–30																7	111	670	10	85	670
30–25																			1	80	300
Hudson Bay:																					
55–50																					
50–45																					
45–40																					
40–35																					
35–30																					
30–25																					

for each 5-degree square of the United States, classified by regions of origin.

95–90			90–85			85–80			80–75			75–70			70–65			65–60			60–55			Longitudes west of Greenwich.
Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Type and north latitudes.
																								North Pacific:
																								55–50.
																								50–45.
1	112	850																						45–40.
5	102	600	5	98	490	3	114	350	3	67	733													40–35.
1	106	600	2	98	625	1	42	800	1	42	800													35–30.
																								30–25.
																								South Pacific:
			1	125	700																			55–50.
1	62	850										1	71	650										50–45.
2	68	875	3	87	833	2	57	1,000	1	50	1,000	1	50	1,000										45–40.
3	89	700	1	101	600																			40–35.
																								35–30.
																								30–25.
7	111	657	8	114	694	7	108	714																Alberta:
15	95	680	25	108	648	25	105	556	29	91	483	21	94	409	6	100	392							55–50.
35	93	737	16	94	634	14	82	543	11	87	477	26	90	481	2	54	675							50–45.
20	88	588	19	84	555	21	89	421	15	94	510	7	34	579										45–40.
7	102	536	6	109	450	6	86	283	4	42	688													40–35.
3	67	767																						35–30.
																								30–25.
																								Plateau and Rocky Mt. Region:
1	113	800	1	113	800	2	144	575																55–50.
4	84	988	2	106	675	6	100	683	3	105	500	4	58	762	1	60	750							50–45.
6	87	617	12	81	629	12	80	550	5	52	690	2	47	950										45–40.
6	74	733	6	72	667	1	145	150	3	36	717													40–35.
			1	75	400	1	110	200																35–30.
																								30–25.
			4	114	512																			Hudson Bay:
			3	108	417	6	92	592	5	93	620													55–50.
												1	61	550										50–45.
																								45–40.
																								40–35.
																								35–30.
																								30–25.

for each 5-degree square of the United States, classified by regions of origin.

															2	100	300							North Pacific:
2	108	850	2	87	625	2	80	625	2	78	550													55–50.
5	99	800	1	97	500	2	86	725	2	86	725	1	55	650										50–45.
4	94	800	5	91	570	3	98	467	2	131	475													45–40.
2	120	800	1	81	750	2	62	625	2	218	425													40–35.
																								35–30.
																								30–25.
																								South Pacific:
																								55–50.
																								50–45.
																								45–40.
																								40–35.
																								35–30.
			2	54	650																			30–25.
2	47	900	1	115	150	2	152	125																Alberta:
8	116	700																						55–50.
23	97	572	25	103	638	17	104	612	9	96	540	4	114	488	4	127	500							50–45.
31	99	615	22	92	659	21	88	550	13	70	512	16	66	522	3	46	450							45–40.
19	91	703	17	87	782	10	79	675	11	71	512	4	34	362										40–35.
9	91	661	2	91	600	1	47	1,300	1	35	850													35–30.
3	85	533	2	102	400																			30–25.
																								Plateau and Rocky Mt. Region:
1	78	850	2	94	875	2	120	750	2	130	325	1	102	400	1	102	400							55–50.
5	90	780	2	66	750	2	63	650	5	76	480	3	52	683										50–45.
7	81	721	5	95	680	3	104	567	1	122	700													45–40.
3	94	433	5	92	360	2	93	575																40–35.
																								35–30.
																								30–25.
																								Hudson Bay:
3	121	567	4	111	575																			55–50.
2	102	550	7	124	636	9	113	694	7	116	436	6	152	233	7	98	350	1	90	300				50–45.
			1	60	750	2	100	600	1	125	150	5	79	570										45–40.
			1	166	550	1	166	550	1	17	500	2	28	625										40–35.
						1	160	300																35–30.
						1	160	300																30–25.

TABLE 6.—*Numbers, direction, and speed of movement of March anticyclones*

Longitudes west of Greenwich.	130–125			125–120			120–115			115–110			110–105			105–100			100–95		
Type and north latitudes.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.
North Pacific:																					
55–50				2	105	675	2	105	525	2	90	600	4	100	488	4	128	350	2	136	400
50–45	12	87	558	21	104	610	9	101	644	9	104	578	3	102	833	4	147	538	2	74	625
45–40	2	85	550	3	75	617	7	122	643	11	106	677	8	115	588	8	119	512	4	114	600
40–35							1	112	950	3	109	883	3	109	883	5	100	690	8	104	594
35–30																1	64	1,050	5	81	740
30–25																					
South Pacific:																					
55–50																					
50–45	3	50	183	9	96	517	2	130	625	1	152	300	1	117	700						
45–40	9	35	333	20	37	452	10	101	580	10	127	685	5	127	590	2	112	650	3	123	800
40–35	2	28	225	15	40	563	3	41	550	3	99	1,050	5	99	860	5	94	720	4	91	888
35–30							2	58	800				1	78	900	8	96	817	4	80	850
30–25																					
Alberta:																					
55–50							28	108	427	59	118	490	70	122	506	50	125	575	37	114	597
50–45										16	120	566	37	126	630	47	128	646	76	113	651
45–40										3	161	617	8	136	688	25	123	616	41	115	630
40–35										1	140	300	1	130	700	12	128	638	33	106	698
35–30																6	112	500	9	80	794
30–25																1	97	600	4	72	688
Plateau and Rocky Mountains Region:																					
55–50							2	102	775	6	117	758	5	124	840	5	127	830	1	150	1,150
50–45							2	90	650	3	98	933	8	109	644	14	114	654	10	118	550
45–40							1	83	950	2	84	625	1	71	1,300	6	75	542	11	101	600
40–35																			3	105	800
35–30																					
30–25																					
Hudson Bay:																			1	110	900
55–50																					
50–45																					
45–40																					
40–35																					
35–30																					
30–35																					

TABLE 7.—*Numbers, direction, and speed of movement of April anticyclones*

North Pacific:																					
55–50	1	76	500	2	80	450	8	110	350	11	111	400	15	110	453	3	95	533	5	89	400
50–45	25	75	596	35	77	516	14	103	604	15	106	507	11	108	559	13	128	569	7	144	621
45–40	5	69	500	14	68	514	11	111	614	18	105	661	14	121	664	17	121	632	14	111	643
40–35													7	117	621	7	112	643	15	109	593
35–30																5	99	670	9	96	683
30–25																			4	91	875
South Pacific:																					
55–50	1	87	1,000	2	110	825	5	115	750	5	115	790	2	118	800	1	140	550	7	106	407
50–45	15	60	367	38	81	643	15	102	693	13	106	642	12	104	492	6	100	533	7	115	421
45–40	29	32	417	48	32	484	8	99	700	16	108	634	12	104	598	14	103	525	7	86	514
40–35	10	9	315	42	5	406	1	47	300	2	94	900	5	90	680	8	110	625	9	90	661
35–30				3	−37	300	2	−45	525							4	95	712	3	87	800
30–25																			1	82	550
Alberta:																					
55–50							10	115	620	24	118	585	34	116	554	26	117	514	26	121	571
50–45							2	101	925	9	121	611	15	116	627	25	121	512	38	113	539
45–40													4	147	575	11	113	591	16	117	544
40–35																6	133	683	13	107	604
35–30																1	116	800			
30–25																					
Plateau and Rocky Mountains Region:																					
55–50																			1	85	250
50–45							2	104	600	7	105	636	9	101	622	5	101	530	7	95	500
45–40										3	69	650	4	110	675	17	116	588	8	105	638
40–35							1	81	650	1	81	650				6	95	708	8	83	738
35–30													1	50	650	1	80	600			
30–25																					
Hudson Bay:																					
55–50																					
50–45																					
45–40																					
40–35																					
35–30																					
30–25																					

for each 5-degree square of the United States, classified by regions of origin.

95–90			90–85			85–80			80–75			75–70			70–65			65–60			60–55			Longitudes west of Greenwich.
Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Type and north latitudes.
																								North Pacific:
1	93	750	3	84	650	1	98	800				1	136	350	1	187	600							55–50.
1	102	550				1	60	700																50–45.
3	83	483	4	94	638	5	87	470	1	180	300													45–40.
6	68	592	1	89	533	1	90	500																40–35.
																								35–30.
																								30–25.
																								South Pacific:
																								55–50.
			1	73	500	1	69	750	1	82	850													50–45.
3	78	683	2	68	375	3	95	517	1	86	300	1	135	700										45–50.
1	91	800	2	106	550	3	65	367	1	66	450													40–35.
2	70	725				1	43	400	1	95	750													35–30.
						1	43	400																30–25.
																								Alberta:
11	110	660	6	114	642	1	133	500																55–50.
26	107	638	34	110	532	38	113	536	14	97	511	7	122	500	5	102	400							50–45.
22	98	670	23	98	641	26	113	558	21	101	495	19	103	453	2	128	500							45–40.
21	90	652	31	91	606	17	88	579	12	64	538	11	59	618										40–35.
4	82	662	6	132	358	5	103	470	3	108	633													35–30.
3	83	667	2	58	500	3	43	350																30–25.
																								Plateau and Rocky Mt. Region.
																								55–50.
			1	100	700	3	90	533	2	154	250	2	128	175	1	80	350							50–45.
8	87	731	4	73	475	8	83	456	4	80	488	6	77	356	1	80	350							45–40.
9	90	728	6	73	575	7	83	407	2	80	275	1	30	350										40–35.
4	84	562	4	103	538	1	80	200	1	80	200													35–30.
2	94	600	2	87	525																			30–35.
																								Hudson Bay.
3	109	467	2	144	625																			55–50.
			10	105	450	12	113	525	3	115	533	1	160	350	1	106	450							50–45.
						3	88	733	2	108	675	2	116	550										45–40.
												1	46	800										40–35.
																								35–30.
																								30–25.

for each 5-degree square of the United States, classified by regions of origin.

3	97	367																						**North Pacific:**
4	105	425	2	117	575	3	130	650																55–50.
7	104	536	6	117	458	4	108	462	4	118	512	1	50	400										50–45.
12	110	592	11	114	441	10	155	425	2	199	250													45–40.
5	87	550	7	107	443	7	133	286	4	132	225													40–35.
1	89	850	2	76	475	2	65	325	1	165	250													35–30.
																								30–25.
3	108	483																						**South Pacific:**
3	100	483	10	121	590	9	120	594	1	112	500													55–50.
5	108	480	1	144	850	4	102	738	2	89	500													50–45.
6	93	608	4	80	488	4	117	400	3	160	383													45–40.
1	106	800	2	28	575	2	98	425	3	197	383													40–35.
3	94	600	2	116	475	1	130	400																35–30.
																								30–25.
10	112	570	3	129	567	3	134	650																**Alberta:**
22	111	445	32	108	514	17	121	597	5	86	660	1	92	300										55–50.
11	95	650	17	106	494	18	115	514	8	107	500	5	90	500	3	53	550	1	48	550				50–45.
8	76	562	14	106	525	7	82	550	6	115	567													45–40.
			4	115	450	1	128	300																40–35.
						1	135	200																35–30.
																								30–25.
																								Plateau and Rocky Mt. Region.
2	98	250	2	132	275																			55–50.
2	110	600	8	139	556	4	124	625	2	85	450	1	90	250	1	117	450							50–45.
1	84	550	5	93	640	8	80	494	7	89	436	6	79	475										45–40.
8	85	694	6	95	525	2	88	375	5	48	470	3	43	717										40–35.
1	94	450	1	120	400																			35–30.
																								30–25.
																								Hudson Bay:
			5	114	330	2	104	650																55–50.
			8	115	425	16	123	456	8	117	469	4	118	400	4	94	312							50–45.
			1	66	400	4	91	562	4	122	575	1	157	350										45–40.
									1	140	150	2	85	775										40–35.
									2	225	175													35–30.
																								30–25.

TABLE 8.—*Numbers, direction, and speed of movement of May anticyclones*

Longitudes west of Greenwich.	130–125			125–120			120–115			115–110			110–105			105–100			100–95		
Type and north latitudes.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.
North Pacific:																					
55–50				3	96	567	4	107	712	7	121	693	3	159	417	1	162	900			
50–45	26	80	650	36	92	715	11	103	673	21	113	626	20	124	558	11	124	614	7	93	543
45–40	6	64	475	6	64	525	2	94	625	13	96	765	18	111	711	11	106	659	14	100	579
40–35							2	96	550	1	105	500	5	113	650	6	96	700	16	112	591
35–30													1	118	600	2	96	825	2	110	650
30–25																					
South Pacific:																					
55–50							4	90	600	3	96	633	5	115	480	3	101	383	2	132	200
50–45	6	70	483	18	58	361	5	70	450	8	86	481	5	114	650	6	149	642	5	168	580
45–40	10	16	375	16	28	459	4	80	588	5	66	780	7	75	829	4	79	750	5	120	550
40–35	2	−4	375	9	4	439	1	−30	600							2	120	675	5	105	470
35–30				2	6	325	2	8	300										1	138	550
30–25																					
Alberta:																					
55–50				1	93	500	15	106	493	32	111	486	45	126	476	43	124	492	35	115	527
50–45										5	115	520	20	123	501	25	106	420	47	118	503
45–40										1	137	300	3	164	767	9	133	517	25	121	498
40–35													1	130	700	6	138	600	13	108	638
35–30													1	130	700	2	125	400	5	92	510
30–25																			3	75	550
Plateau and Rocky Mountains Region:																					
55–50																					
50–45							2	106	775	3	114	550	4	120	712	3	148	500	6	125	425
45–40							1	97	550	2	108	725	16	110	506	12	106	533	4	72	525
40–35													1	91	650	5	97	720	9	83	800
35–30																					
30–25																					
Hudson Bay:																					
55–50																					
50–45																			1	205	200
45–40																			2	132	375
40–35																					
35–30																					
30–25																					

TABLE 9.—*Number, direction, and speed of movement of June anticyclones*

North Pacific:																					
55–50				2	108	625	9	110	583	4	119	475	9	130	472	6	120	492	2	114	450
50–45	23	77	557	41	83	610	19	94	642	21	100	529	20	111	455	26	103	452	23	108	478
45–40	7	46	329	10	56	465	9	80	417	19	74	476	23	94	446	26	101	458	18	90	439
40–35													2	153	450	13	103	535	8	83	525
35–30																1	111	450	3	72	733
30–25																					
South Pacific:																					
55–50				2	88	350	2	88	350	3	113	450	2	140	500	3	124	650	4	118	600
50–45	7	55	421	18	74	511	2	104	625	8	116	606	5	109	510	4	90	550	5	97	570
45–40	16	36	378	21	19	474	1	70	450	7	75	379	10	82	480	6	118	642	3	122	767
40–35	2	26	325	8	8	469										2	130	350	1	170	250
35–30																			3	83	583
30–25																					
Alberta:																					
55–50				1	131	600	8	117	419	21	112	488	24	114	571	18	115	608	14	122	564
50–45										6	106	442	15	123	460	23	117	443	24	109	565
45–40													1	40	450	9	114	483	15	96	627
40–35																			4	94	625
35–30																1	52	600	1	52	600
30–25																					
Plateau and Rocky Mountains Region:																					
55–50																					
50–45							1	130	850	3	122	500	5	98	450	6	114	492	9	99	522
45–40										3	72	500	9	74	511	12	99	525	9	89	556
40–35													4	104	525	11	86	591	11	112	505
35–30																2	96	525	5	103	540
30–25																					
Hudson Bay:																					
55–50																					
50–45																					
45–40																					
40–35																					
35–30																					
30–25																					

for each 5-degree square of the United States, classified by regions of origin.

95–90			90–85			85–80			80–75			75–70			70–65			65–60			60–55			Longitudes west of Greenwich.
Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Type and north latitudes.
																								North Pacific:
3	111	450	7	102	393	11	114	573	5	120	540	1	97	450										55–50.
4	84	462	6	105	408	8	110	512	4	131	488	4	115	362										50–45.
12	114	508	8	106	694	1	44	1,000				4	176	288										45–40.
4	84	538	6	109	383	3	94	217	1	67	350													40–35.
1	62	750	1	62	750																			35–30.
																								30–25.
																								South Pacific:
			1	100	550																			55–50.
			1	82	600				2	98	850	1	95	850										50–45.
6	123	558	9	109	372	7	134	414	3	129	450				1	60	600							45–40.
2	71	450	2	88	225	6	100	325	3	91	450	2	50	775										40–35.
																								35–30.
																								30–25.
																								Alberta:
8	112	525	6	118	550	3	101	667																55–50.
25	101	456	38	113	478	28	120	475	7	114	450	5	101	420	2	142	400							50–45.
14	107	539	18	107	461	25	119	384	15	122	457	8	103	475	3	55	450							45–40.
8	81	631	13	89	446	12	122	462	7	161	514	1	50	800										40–35.
1	65	600	2	78	300	1	37	250																35–30.
			1	60	250	1	60	250																30–25.
																								Plateau and Rocky Mt. Region:
1	100	350																						55–50.
1	100	350	2	107	500	2	118	575																50–45.
3	109	683	4	91	675	7	97	536	2	116	500													45–40.
4	95	562	3	71	733				1	195	800													40–35.
1	85	700	5	83	280																			35–30.
																								30–25.
																								Hudson Bay:
1	91	950	2	108	550	2	142	450																55–50.
3	179	500	11	135	427	13	135	396	7	126	479	4	124	425	7	167	414							50–45.
						5	130	500	2	180	475	4	173	312	5	178	350							45–40.
2	101	225	4	99	200	2	131	375	4	165	438	7	197	443	2	238	450							40–35.
									2	182	225													35–30.
									1	205	200													30–25.

for each 5-degree square of the United States, classified by regions of origin.

																								North Pacific:
11	111	405	13	100	427	13	109	485	3	135	367	2	145	425	3	126	167							55–50.
21	88	436	15	108	363	12	104	454	9	117	406	9	88	383	3	126	133							50–45.
10	109	530	6	98	600	8	106	438	5	193	260	2	149	300										45–40.
4	80	525	4	128	412																			40–35.
			1	250	300																			35–30.
																								30–25.
																								South Pacific:
3	103	367	6	111	392	6	112	377	3	128	300	1	193	1 000										55–50.
3	121	617	4	106	438	4	141	500	3	153	717	4	193	500	2	218	675							50–45.
1	77	750	1	77	750	3	105	450	2	83	350	6	133	308										45–40.
1	45	700	3	64	417	1	56	400	7	171	150													40–35.
																								35–30.
																								30–25.
																								Alberta:
5	104	380	5	99	570	1	93	550																55–50.
19	115	466	30	123	430	17	128	462	11	116	486	1	135	500	2	144	400							50–45.
13	116	531	13	99	512	21	116	495	7	128	514				3	96	567							45–40.
8	103	494	6	79	558	3	77	600	3	123	717	6	104	417										40–35.
									1	210	300													35–30.
																								30–25.
																								Plateau and Rocky Mt. Region:
6	94	417	13	123	385	10	118	460	1	93	500													55–50.
7	83	500	8	115	475	12	106	425	4	83	525	3	65	483	1	60	150							50–45.
9	95	544	7	113	464	5	171	460	1	180	750													45–40.
2	158	350	1	81	200																			40–35.
3	107	450	2	123	500																			35–30.
																								30–25.
			2	116	525	3	144	367																Hudson Bay:
6	130	358	8	138	456	10	117	485	2	144	600	2	166	475	3	184	483	2	211	425				55–50.
1	107	300	8	99	338	9	130	467	2	135	325	5	200	360	3	212	350							50–45.
						2	133	550	3	154	350	3	211	450										45–40.
						1	180	300	2	199	450													40–35.
																								35–30.
																								30–25.

TABLE 10.—*Numbers, direction, and speed of movement of July anticyclones*

Longitudes west of Greenwich.	130–125			125–120			120–115			115–110			110–105			105–100			100–95		
Type and north latitudes.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.
North Pacific:																					
55–50				7	88	593	7	97	493	6	114	575	6	121	442	7	108	393	3	105	400
50–45	23	80	578	39	87	459	15	105	473	21	97	550	12	112	438	16	112	350	16	102	460
45–40	1	62	300	4	21	325	3	44	267	9	88	472	10	106	495	14	100	432	22	100	493
40–35													2	129	575	3	134	550	2	136	325
35–30																2	108	475	2	94	425
30–25																					
South Pacific:																					
55–50										1	103	850									
50–45	6	41	483	7	52	486				3	111	683	1	125	850	4	104	500	4	76	550
45–40	3	−7	383	10	20	460	5	57	480	4	79	388	2	84	575	3	110	600	3	103	467
40–35				3	18	533	1	52	300										2	88	425
35–30																					
30–25																					
Alberta:																					
55–50				4	120	612	14	120	521	25	119	550	27	118	526	24	121	485	21	121	500
50–45				1	111	550	1	115	400	16	112	538	28	113	527	28	116	541	33	113	567
45–40							1	115	400	3	104	467	5	98	390	16	103	522	27	98	535
40–35													2	90	425	2	120	600	6	100	667
35–30																			1	70	800
30–25																					
Plateau and Rocky Mountains Region:																					
55–50										2	106	475	1	120	450				1	122	500
50–45							6	109	442	15	110	510	12	102	438	15	113	427	13	112	469
45–40							1	124	400	4	97	475	7	109	500	17	96	429	15	104	463
40–35													2	85	300	6	88	483	13	79	562
35–30																					
30–25																					
Hudson Bay:																					
55–50																					
50–45																					
45–40																					
40–35																					
35–30																					
30–25																					

TABLE 11.—*Numbers, direction, and speed of movement of August anticyclones*

North Pacific:																					
55–50	2	50	250	13	81	446	14	95	500	14	114	529	13	106	469	9	110	483	5	119	440
50–45	26	74	492	49	82	559	19	94	653	28	115	523	28	112	520	21	98	438	21	95	452
45–40	2	68	775	6	67	575	2	104	1,200	7	123	429	12	104	475	19	95	476	14	71	554
40–35																4	89	638	4	68	650
35–30																					
30–25																					
South Pacific:																					
55–50										3	119	333									
50–45	3	63	450	10	70	485	2	101	850	6	114	483	3	121	617	1	77	650	2	78	625
45–40	7	12	386	8	5	362				2	138	450	5	94	210	5	88	470	3	87	633
40–35	1	−5	450	5	−13	330													1	95	700
35–30				2	−32	325															
30–25																					
Alberta:																					
55–50				7	111	757	20	112	582	33	106	598	41	118	550	27	120	528	27	112	519
50–45							1	117	650	11	118	623	21	123	500	32	114	473	44	103	519
45–40													8	119	456	21	110	474	22	94	536
40–35													2	96	425	10	96	450	7	90	607
35–30																					
30–25																					
Plateau and Rocky Mountains Region:																					
55–50																					
50–45							1	79	1,000	7	107	593	11	104	482	9	93	489	8	108	594
45–40										3	122	483	15	80	470	22	92	480	18	90	481
40–35																1	67	1,050	6	77	542
35–30																					
30–25																					
Hudson Bay:																					
55–50																					
50–45																					
45–40																					
40–35																					
35–30																					
30–25																					

for each 5-degree square of the United States, classified by regions of origin.

95–90			90–85			85–80			80–75			75–70			70–65			65–60			60–55			Longitudes west of Greenwich.
Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Type and north latitudes.
																								North Pacific:
9	113	489	10	113	515	3	92	567	3	113	400	4	130	425	1	92	550							55–50.
15	126	620	11	114	545	8	89	656	4	70	588	1	42	700										50–45.
4	82	750	5	118	400	9	127	261	8	131	394	2	190	525										45–40.
2	89	550	3	139	433	1	145	350	1	235	500													40–35.
						1	145	350																35–30.
																								30–25.
																								South Pacific:
2	80	550	2	78	450	2	75	775							2	142	325							55–50.
1	155	900																						50–45.
2	84	725	1	145	600	1	96	350	1	91	200													45–40.
			2	126	500																			40–35.
						1	106	400																35–30.
																								30–25.
																								Alberta:
4	123	438	1	107	400																			55–50.
17	121	385	26	120	358	13	117	377	4	124	400	1	180	200										50–45.
25	97	528	21	100	440	16	117	544	7	98	543	5	89	480										45–40.
9	81	561	12	89	592	7	96	421	3	101	383	2	44	500										40–35.
1	80	500																						35–30.
																								30–25.
																								Plateau and Rocky Mt. Region:
1	122	500																						55–50.
2	100	200	6	116	442	5	106	480	3	117	517	2	109	400										50–45.
8	99	462	13	100	458	12	115	462	7	93	443	4	47	550										45–40.
10	88	505	13	94	458	9	149	528	3	200	517													40–35.
			1	112	450	1	167	600																35–30.
																								30–25.
																								Hudson Bay:
2	133	450																						55–50.
8	130	431	15	136	353	11	136	336	4	131	512	1	153	300	2	128	375							50–45.
1	116	400	8	120	400	17	121	406	7	133	521	7	156	407	1	220	100							45–40.
			1	96	650				4	166	312	5	177	410										40–35.
			1	137	500	2	225	275	5	222	340	2	220	450										35–30.
			1	137	500	5	164	110	2	200	100													30–25.

for each 5-degree square of the United States, classified by regions of origin.

																								North Pacific:
1	92	950	1	93	900																			55–50.
15	99	387	17	98	326	11	109	409	6	110	533	3	132	383	1	175	400							50–45.
11	73	523	10	88	360	14	95	389	6	108	358	2	104	375	1	50	350							45–40.
3	86	833	1	91	600	1	73	750	1	50	900	1	50	900										40–35.
						1	55	450	1	55	450													35–30.
																								30–25.
																								South Pacific:
1	78	600	3	88	767	4	112	462	3	148	317	1	101	600										55–50.
1	65	850							2	122	275	3	78	333										50–45.
2	86	675										1	56	350										45–40.
																								40–35.
																								35–30.
																								30–25.
																								Alberta:
3	106	617	1	102	1,000																			55–50.
33	101	480	50	114	448	34	121	494	14	113	511	6	109	425	6	86	425	1	100	200				50–45.
21	88	569	23	94	502	35	113	474	21	129	412	9	127	478	4	64	450							45–40.
8	82	406	9	80	528	6	122	425	13	143	358	5	120	640										40–35.
1	70	150	5	128	220	3	152	283	2	92	300													35–30.
																								30–25.
																								Plateau and Rocky Mt. Region:
6	106	467	10	106	490	9	108	500	2	82	575	1	89	433	4	129	262							55–50.
13	82	492	12	92	425	12	122	421	7	132	414	3	73	550										50–45.
4	70	538	3	98	267	6	134	400	7	156	229	1	200	350										45–40.
																								40–35.
																								35–30.
																								30–25.
																								Hudson Bay:
3	128	283	10	130	390	1	95	450																55–50.
2	128	600	23	124	387	25	110	456	10	110	490	4	114	275										50–45.
			2	108	375	8	115	375	11	122	364	10	101	340	7	59	379							45–40.
									4	120	512	3	106	517										40–35.
																								35–30.
																								30–25.

TABLE 12.—*Numbers, direction, and speed of movement of September anticyclones*

Longitudes west of Greenwich.	130–125			125–120			120–115			115–110			110–105			105–100			100–95		
Type and north latitudes.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.
North Pacific:																					
55–50				9	94	713	11	99	645	10	124	565	11	109	532	4	124	462	5	111	580
50–45	33	72	453	59	95	609	31	97	618	22	117	602	22	114	518	14	116	589	10	104	635
45–40	7	39	357	7	71	486	11	100	564	16	90	638	22	104	595	22	98	608	28	94	596
40–35										5	69	550	1	75	400	9	121	528	10	86	690
35–30																2	120	400	6	98	442
30–25																			2	70	375
South Pacific:																					
55–50	1	85	900	4	94	688	3	104	617	3	100	517				1	94	600			
50–45	8	49	350	21	68	414	9	108	572	12	115	629	5	119	630	5	113	630	4	105	575
45–40	19	35	421	36	40	461	12	92	575	10	92	905	9	114	756	10	134	585	8	130	562
40–35	5	—1	410	16	4	394	1	61	400				3	114	583	6	69	817	3	76	883
35–30																1	64	1,600	1	64	1,600
30–25																					
Alberta:																					
55–50				5	108	680	31	111	606	45	115	543	53	116	566	34	120	569	33	116	595
50–45							3	88	533	17	119	562	29	118	609	32	116	561	58	112	570
45–40										3	74	733	8	95	556	22	109	525	27	104	594
40–35													2	94	600	5	99	460	12	93	512
35–30																					
30–25																					
Plateau and Rocky Mountains Region:																					
55–50																					
50–45							2	100	825	4	110	650	5	103	790	3	105	817	4	123	738
45–40							3	61	650	4	108	512	10	93	640	8	80	681	14	83	689
40–35													1	140	650	4	88	650	5	68	960
35–30																			2	110	325
30–25																					
Hudson Bay:																					
55–50																					
50–45																					
45–40																					
40–35																			1	146	350
35–30																					
30–25																					

TABLE 13.—*Numbers, direction, and speed of movement of October anticyclones*

North Pacific:																					
55–50				4	96	888	5	104	680	4	122	538	5	125	550	1	98	550	2	102	650
50–45	22	82	545	54	96	556	43	109	502	35	113	570	20	114	442	15	117	537	16	106	641
45–40	12	62	502	24	79	512	32	103	567	45	105	593	48	118	554	25	125	538	23	108	591
40–35										2	110	775	6	96	717	14	107	579	28	96	650
35–30																7	101	579	14	86	639
30–25																					
South Pacific:																					
55–50																					
50–45	3	68	367	16	80	494	11	103	632	3	113	500	2	108	350	3	61	367	4	99	425
45–40	14	38	411	33	47	442	15	99	470	18	109	653	12	98	633	4	147	550	3	76	583
40–35	1	38	600	18	39	492	4	53	512	5	123	410	5	92	710	7	114	593	4	90	688
35–30				1	—5	750	1	—32	550							1	84	750	1	73	850
30–25																					
Alberta:																					
55–50				2	114	775	26	119	583	42	121	555	41	123	572	26	121	677	16	108	712
50–45							3	99	567	18	119	508	28	127	605	30	123	640	34	111	682
45–40										5	124	510	16	136	569	20	134	615	22	121	511
40–35										2	130	850	4	120	638	4	144	450	11	100	723
35–30													2	99	975	6	104	692	6	70	842
30–25																			1	55	850
Plateau and Rocky Mountains Region:																					
55–50																					
50–45							2	80	750	5	81	520	6	120	475	7	101	650	6	87	875
45–40							8	80	531	20	84	595	22	92	584	14	99	725	13	85	708
40–35							1	55	450	2	78	375	6	82	575	8	90	600	11	99	600
35–30																1	86	600	1	88	700
30–25																					
Hudson Bay:																					
55–50																					
50–45																					
45–40																					
40–35																					
35–30																					
30–25																					

for each 5-degree square of the United States, classified by regions of origin.

95–90			90–85			85–80			80–75			75–70			70–65			65–60			60–55			Longitudes west of Greenwich.
Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Type and north latitudes.
																								North Pacific:
2	105	400																						55–50.
5	94	450	10	98	565	14	106	554	5	112	560	7	102	493	4	117	450							50–45.
15	82	687	13	84	531	12	96	588	13	93	577	13	103	477										45–40.
8	74	731	11	78	545	10	109	420	10	77	520	12	90	392	1	46	800							40–35.
5	75	450	4	66	325	3	155	267	2	211	475													35–30.
1	70	350																						30–25.
																								South Pacific:
																								55–50.
1	106	800	1	106	800	1	101	200	5	124	350	2	170	375										50–45.
7	92	679	9	95	544	9	89	411	8	100	419	5	107	410										45–40.
2	80	475	5	83	520	6	62	517	5	62	590	2	65	125										40–35.
																								35–30.
																								30–25.
																								Alberta:
6	120	742	8	118	556																			55–50.
27	106	622	43	109	548	36	117	622	31	112	561	13	118	512	7	115	486	1	81	500				50–45.
20	89	675	15	99	638	18	96	517	23	107	541	24	107	450	5	76	430							45–40.
18	84	544	20	95	478	28	104	430	18	120	433	7	130	500	1	43	800							40–35.
3	114	417	3	174	267	7	143	121	6	142	250													35–30.
																								30–25.
																								Plateau and Rocky Mt. Region:
3	116	517	6	103	500	7	110	529	2	136	425													55–50.
5	85	710	5	101	440	15	95	443	9	114	467	7	79	450	4	58	362							50–45.
5	72	790	4	84	338	14	107	357	5	214	170													45–40.
						1	120	200																40–35.
																								35–30.
																								30–25.
																								Hudson Bay:
2	94	525	3	112	400	3	131	533	1	126	650	1	180	300	2	192	350							55–50.
			13	116	400	9	144	444	5	114	570	7	156	429	7	182	364							50–45.
2	202	450	1	213	500							11	142	277	12	115	267							45–40.
2	180	300							2	227	250	3	223	433	1	221	700							40–35.
3	162	167																						35–30.
																								30–25.

for each 5-degree square of the United States, classified by regions of origin.

																								North Pacific:
2	95	750																						55–50.
3	114	650	7	102	671	5	112	610	6	95	458	7	129	429	7	143	309							50–45.
15	107	520	10	112	475	14	94	518	11	95	550	8	155	356	1	180	150							45–40.
14	79	654	19	76	495	26	80	390	14	83	407	5	110	520										40–35.
11	71	682	4	58	812	6	55	292	3	58	333													35–30.
																								30–25.
																								South Pacific:
5	110	570	1	86	800	5	88	590	3	102	583	3	95	433	3	100	367							55–50.
2	66	500	6	77	608	8	88	688	2	84	375	4	65	450	1	56	550							50–45.
2	65	825	4	74	462	9	136	317	5	141	340													45–40.
1	60	650	2	67	425	1	47	600																40–35.
																								35–30.
																								30–25.
																								Alberta;
5	112	550	3	123	767	3	104	583																55–50.
14	103	611	25	114	562	29	114	593	9	104	494	11	106	332	8	77	244							50–45.
19	97	595	14	121	561	16	112	591	16	107	512	15	113	517	3	66	450							45–40.
11	83	705	19	101	492	15	94	497	17	95	444	11	103	641										40–35.
4	72	938	6	102	658	1	131	400																35–30.
																								30–25.
																								Plateau and Rocky Mt. Region:
			1	93	900	1	88	800																55–50.
4	91	575	6	102	708	5	122	700	5	119	530	2	104	425	2	98	400							50–45.
6	76	717	4	82	650	7	117	464	8	128	319	3	69	600	2	58	625							45–40.
10	88	540	8	89	525	15	90	390	12	126	342	4	108	525										40–35.
6	92	592	3	74	450	7	113	364	2	162	325													35–30.
1	58	1,150				1	140	200																30–25.
																								Hudson Bay:
1	116	550	1	108	450										2	118	300	1	127	400				55–50.
5	80	230	15	126	420	11	127	527	5	101	450	5	110	240	11	118	286	5	147	340				50–45.
			1	150	350	9	139	372	9	122	350	6	126	400	3	140	367							45–40.
						6	112	133	6	69	292	1	232	500										40–35.
																								35–30.
																								30–25.

TABLE 14.—*Numbers, direction, and speed of movement of November anticyclones*

Longitudes west of Greenwich.	130–125			125–120			120–115			115–110			110–105			105–100			100–95		
Type and north latitudes.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.
North Pacific:																					
55–50				2	86	550	8	107	512	3	121	767	5	133	700	1	130	1,300			
50–45	9	88	483	44	90	458	39	105	518	18	116	653	12	133	575	6	127	592	5	129	440
45–40	7	80	586	26	81	463	21	101	502	34	113	575	28	125	777	10	134	610	9	119	478
40–35							2	108	400	3	122	517	12	122	821	22	129	605	16	108	550
35–30													5	96	890	12	91	801	19	88	595
30–25																2	66	700	9	69	500
South Pacific:																					
55–50																					
50–45				2	106	1,150	1	88	750	1	111	550	1	96	550	1	81	750	1	79	1,000
45–40	6	68	550	20	78	538	28	87	360	20	120	410	10	122	668	4	98	712	3	69	700
40–35	2	45	500	12	49	438	9	76	461	14	96	353	13	91	673	4	105	650	7	95	657
35–30				1	8	600	1	8	600	1	54	200	2	62	875	1	81	900	2	82	375
30–25																			1	95	250
Alberta:																					
55–50				4	128	575	28	118	530	60	119	505	64	123	538	34	126	541	33	116	594
50–45				1	150	500	5	124	710	18	126	572	31	116	574	41	123	674	56	113	602
45–40										5	145	510	15	137	593	31	136	545	28	126	650
40–35										1	105	350	5	86	530	9	100	678	23	103	624
35–30																4	69	712	17	84	650
30–25																			5	82	550
Plateau and Rocky Mountains Region:																					
55–50																					
50–45							4	91	612	5	154	500	3	167	417	2	116	500	2	78	450
45–40							8	98	500	17	150	491	19	117	487	11	100	586	6	122	550
40–35							3	102	567	3	50	717	11	73	550	10	104	705	9	97	772
35–30																4	102	788	5	91	670
30–35																			1	68	700
Hudson Bay:																					
55–50																					
50–45																					
45–40																					
40–35																					
35–40																					
30–25																					

TABLE 15.—*Numbers, direction, and speed of movement of December anticyclones*

North Pacific:																					
55–50				1	131	800	2	110	675	1	148	700									
50–45	2	82	375	19	101	384	20	112	390	6	122	383	3	134	967						
45–40	6	92	502	18	104	571	20	115	490	20	116	458	4	100	638	3	130	867	1	110	850
40–35							6	101	720	7	108	621	6	97	975	8	99	775	1	96	700
35–30																4	86	675	8	72	819
30–25																			2	61	1,025
South Pacific:																					
55–50										1	122	850									
50–45				3	78	617	3	104	467	1	122	850				1	140	500			
45–40	3	82	483	19	79	587	22	105	557	22	119	575	5	152	700				2	114	750
40–35	5	76	520	20	52	550	12	59	496	13	123	585	16	120	747	3	120	933			
35–30				3	10	517	4	27	525				2	88	1,025	5	91	770	1	56	950
30–25																3	79	1,017	8	72	875
Alberta:																					
55–50				5	100	610	26	117	515	50	115	542	77	128	651	43	134	617	35	122	563
50–45				1	160	500	8	145	300	7	141	521	38	122	574	45	132	657	71	123	625
45–40				1	152	550	4	152	425	9	158	406	10	151	555	18	137	703	31	125	711
40–35							3	119	400	1	140	200	5	125	160	8	107	881	27	106	702
35–30																5	119	430	19	89	445
30–25																			9	66	622
Plateau and Rocky Mountains Region:																					
55–50																					
50–45							5	115	510	5	136	430	3	138	483	1	155	500	3	133	650
45–40							2	111	450	7	121	657	13	125	712	7	102	721	6	98	733
40–35							2	128	525	2	118	550	2	104	875	9	97	778	14	78	711
35–30													1	72	550	3	60	700	4	72	712
30–25																					
Hudson Bay:																					
55–50																					
50–45																					
45–40																					
40–35																					
35–30																					
30–25																					

for each 5-degree square of the United States, classified by regions of origin.

95–90			90–85			85–80			80–75			75–70			70–65			65–60			60–55			Longitudes west of Greenwich.
Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Number of observations.	Average direction of 24-hour movement in degrees E. of N.	Average 24-hour movement in miles.	Type and north latitudes.
																								North Pacific:
1	81	450	1	69	900	2	68	700																55–50.
8	102	500	4	76	450	8	89	462	3	94	367	2	74	400										50–45.
19	103	518	21	86	464	17	93	503	11	81	564	2	44	825										45–40.
16	80	550	15	83	423	6	69	425																40–35.
9	65	544	1	90	300	1	82	300																35–30.
																								30–25.
																								South Pacific.
2	96	675	3	98	517	2	90	600	1	152	350	1	152	350										55–50.
2	73	675	2	102	450	4	104	450				2	214	400										50–45.
5	110	560	5	141	410	5	119	470																45–40.
6	103	492	4	120	388	6	126	408	3	96	417													40–35.
																								35–30.
																								30–25.
																								Alberta:
5	120	580	2	106	875																			55–50.
26	112	625	21	102	690	16	101	653	11	83	641	9	88	456	8	120	425							50–45.
30	111	673	21	109	502	21	99	479	10	79	540	10	63	605	5	62	620							45–40.
27	91	581	27	90	548	43	98	435	30	111	497	6	46	858										40–35.
11	85	618	8	98	512	5	184	310	9	183	283													35–30.
1	56	1,000	1	56	900	2	150	525																30–25.
																								Plateau and Rocky Mt. Region.
																								55–50.
2	102	450	3	127	283	4	117	175	2	130	275													50–45.
5	87	550	4	81	450	3	138	500	3	151	533	1	83	400										45–40.
8	90	569	10	116	415	8	94	275	7	72	257	1	18	300										40–35.
3	75	617	4	100	288	4	119	175	1	125	200													35–30.
1	68	700																						30–25.
																								Hudson Bay:
			1	87	950																			55–50.
			6	99	633	6	95	592	3	99	383	3	90	383	1	96	450							50–45.
						1	60	700				2	79	550	1	66	600							45–40.
																								40–35.
																								35–30.
																								30–25.

for each 5-degree square of the United States, classified by regions of origin.

																								North Pacific:
																								55–50.
																								50–45.
1	85	700	1	106	400	1	106	400	2	94	275													45–40.
2	84	600	8	76	500	12	97	438	8	91	412													40–35.
5	59	770	5	62	580	3	59	667	1	75	200													35–30.
			2	54	850	1	18	850																30–25.
																								South Pacific:
															1	70	350							55–50.
												1	50	400	2	60	375							50–45.
4	86	925	3	77	800	1	82	550	3	49	433	1	42	550										45–40.
3	93	617	4	70	638	2	57	500																40–35.
5	69	640	3	52	650																			35–30.
																								30–25.
																								Alberta:
11	103	645	4	96	938	2	88	750																55–50.
25	117	622	24	108	629	20	115	580	21	105	421	10	105	330	8	100	319	2	162	275				50–45.
33	112	706	20	98	668	12	97	567	17	91	500	12	68	383	3	73	400							45–40.
25	109	534	36	111	467	38	110	374	28	126	461	5	112	510										40–35.
20	87	458	15	99	423	16	111	309	8	158	325													35–30.
3	68	750	2	103	500	1	120	250																30–25.
																								Plateau and Rocky Mt. Region.
																								55–50.
2	126	675	3	149	733	1	182	750	2	85	675	2	77	450										50–45.
7	78	550	8	84	681	1	71	500	5	65	710	3	51	667										45–40.
10	79	645	17	81	535	17	97	312	9	49	494	2	12	625										40–35.
2	86	650																						35–30.
		475																						30–25.
																								Hudson Bay:
2	114		5	111	510																			55–50.
			6	116	517	13	131	423	10	123	420	5	78	410	1	50	250							50–45.
			1	82	450	2	127	525	5	149	520	5	121	540										45–40.
			1	65	350	2	178	300	3	267	333	1	245	250										40–35.
																								35–30.
																								30–25.

Chart 1.—Regions of appearance of the anticyclones of the United States.

Chart 2.—Tracks of highs and lows for December, 1912; pressure over Alaska was low. (See insert of pressure departures over Alaska.)

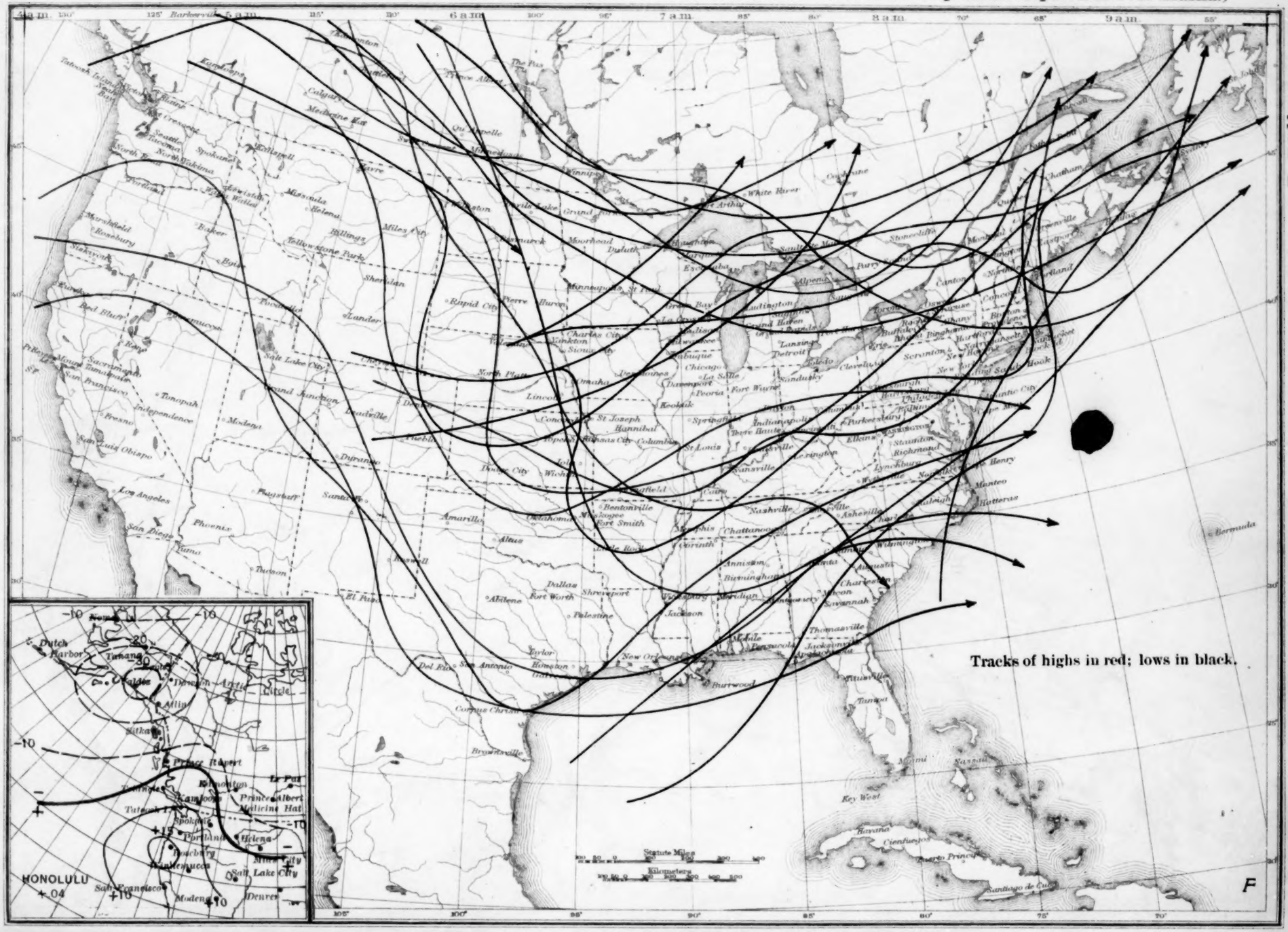

Chart 3.—Tracks of highs and lows for December, 1914; pressure over Alaska was high. (See insert of pressure departures over Alaska.)

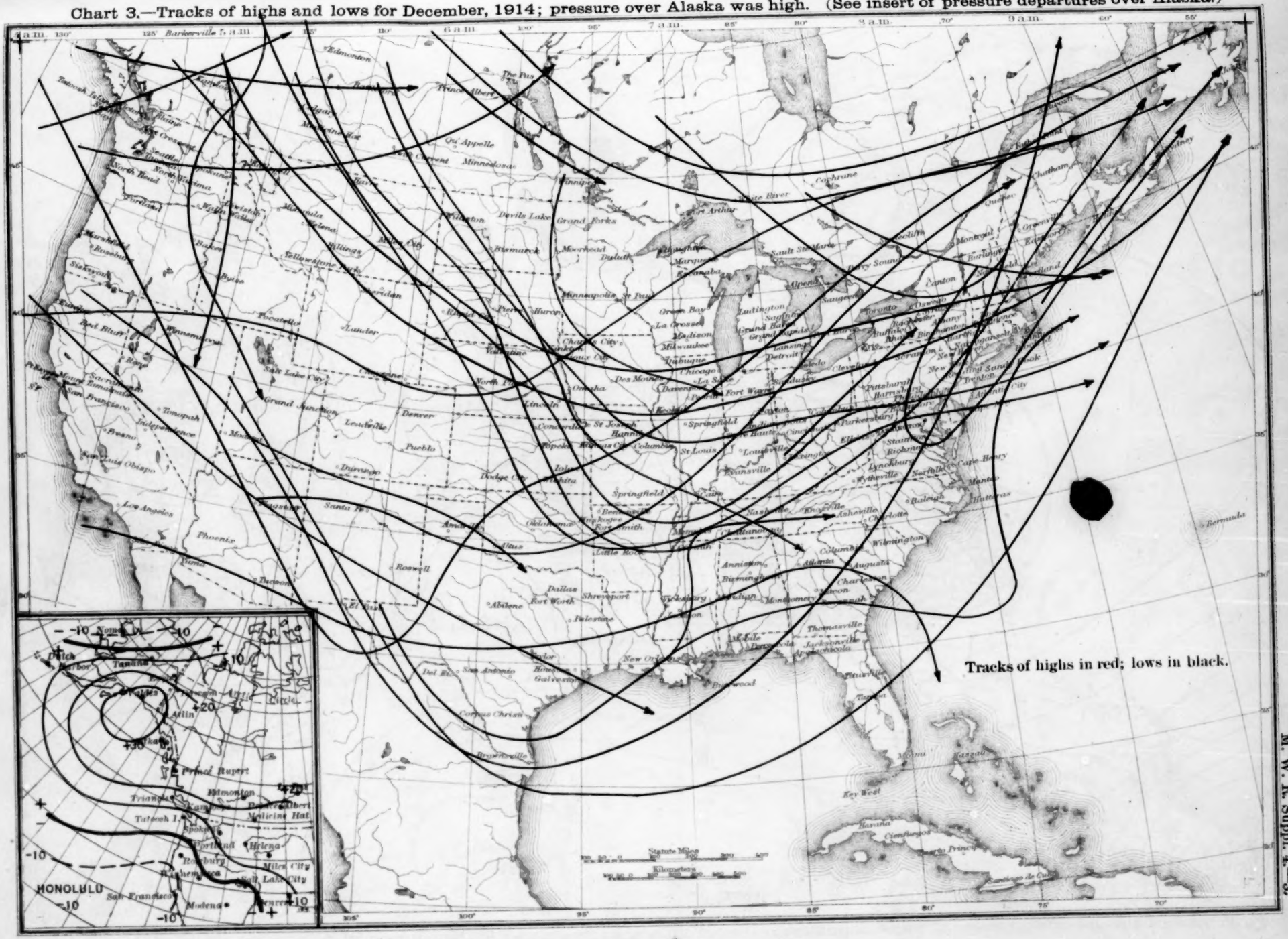

Chart 4.—Typical North Pacific anticyclone (Winter) of Dec. 17-23, 1910, with pressure distribution at 8 a. m., Dec. 17, and subsequent path of high.

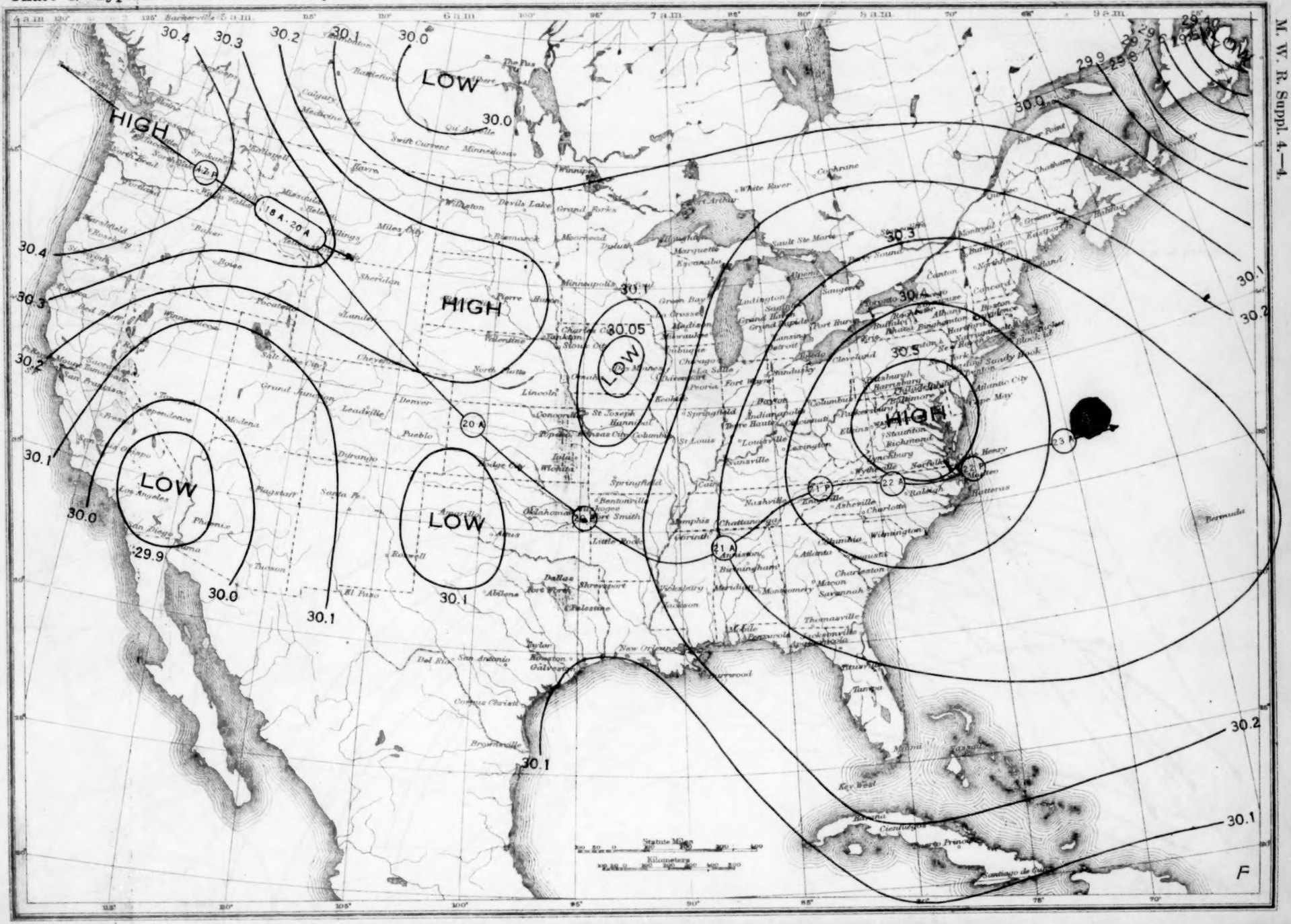

Chart 5.—Typical North Pacific anticyclone (Summer) of July 13-20, 1914, with pressure distribution at 8 a. m., July 14, and subsequent track of high.

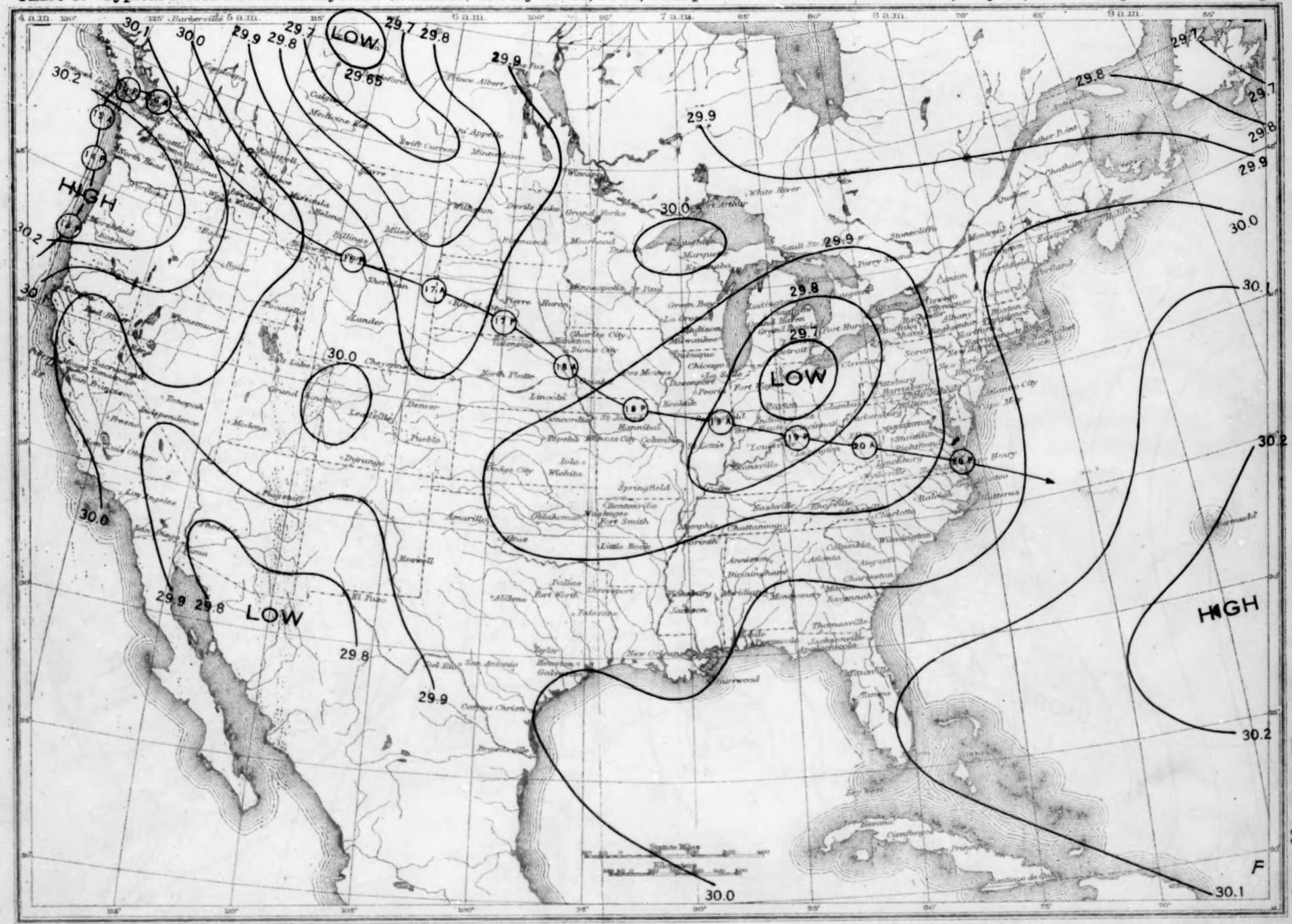

Chart 6.—Typical South Pacific anticyclone (Winter) of Jan. 13-20, 1915; with pressure distribution at 8 a. m., Jan. 14, and subsequent track of high.

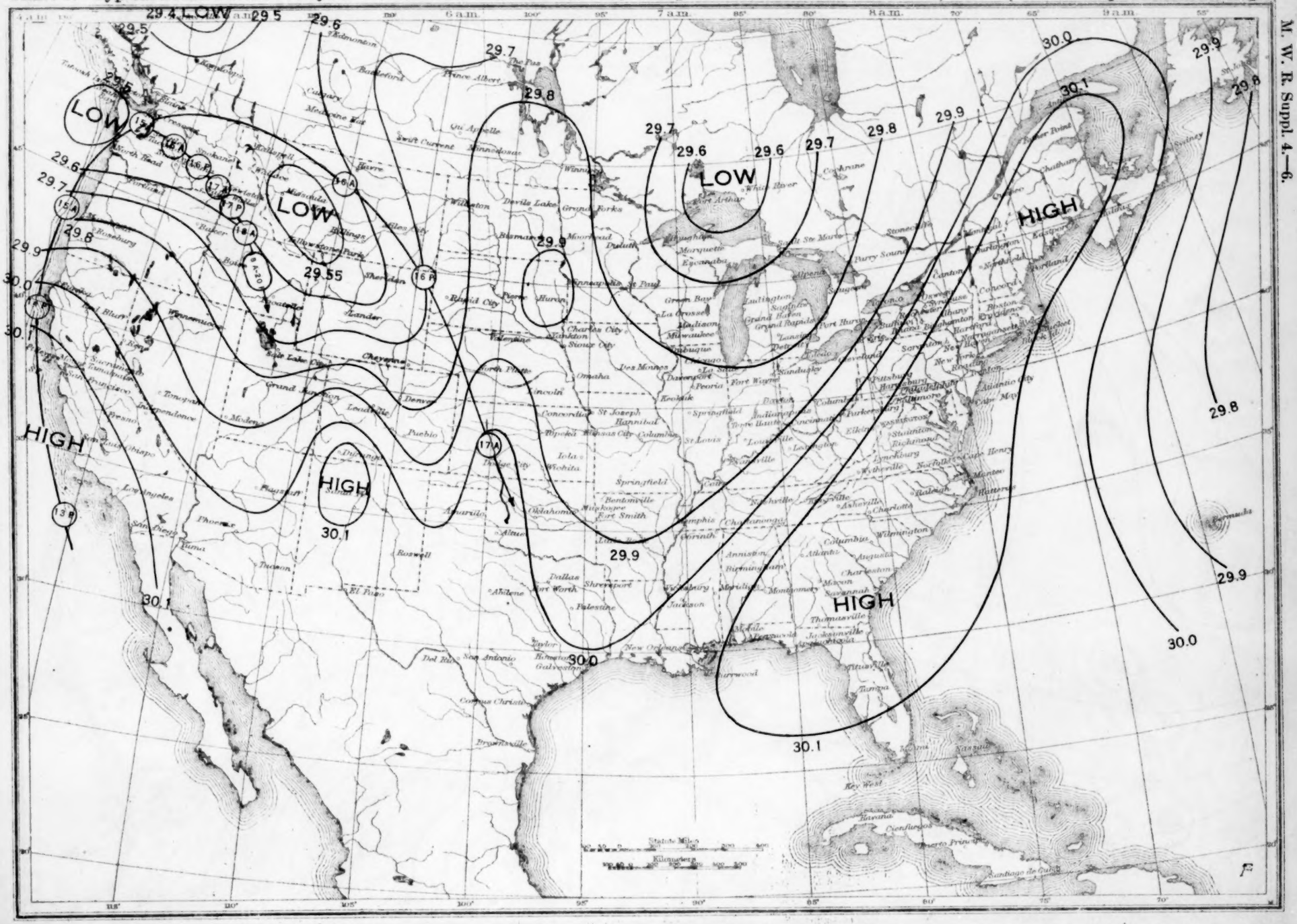

Chart 7.—Typical South Pacific anticyclone (Summer) of July 5-8, 1909; with the pressure distribution at 8 a. m., July 6, and subsequent track of high.

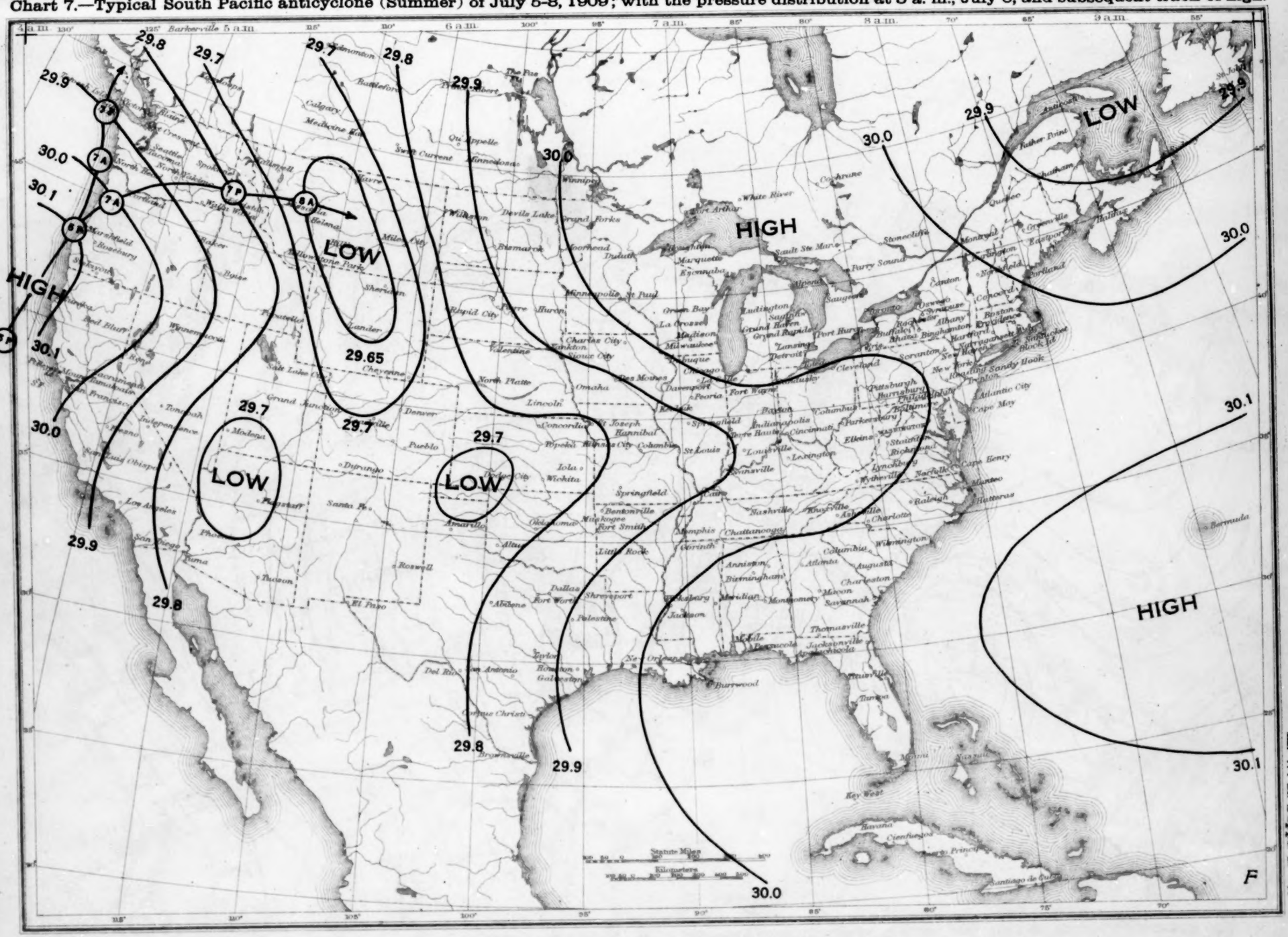

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Chart 8.—Typical Alberta anticyclone (Winter) of Jan. 11-14, 1914; with pressure distribution at 8 a. m., Jan. 12, and subsequent track of high.

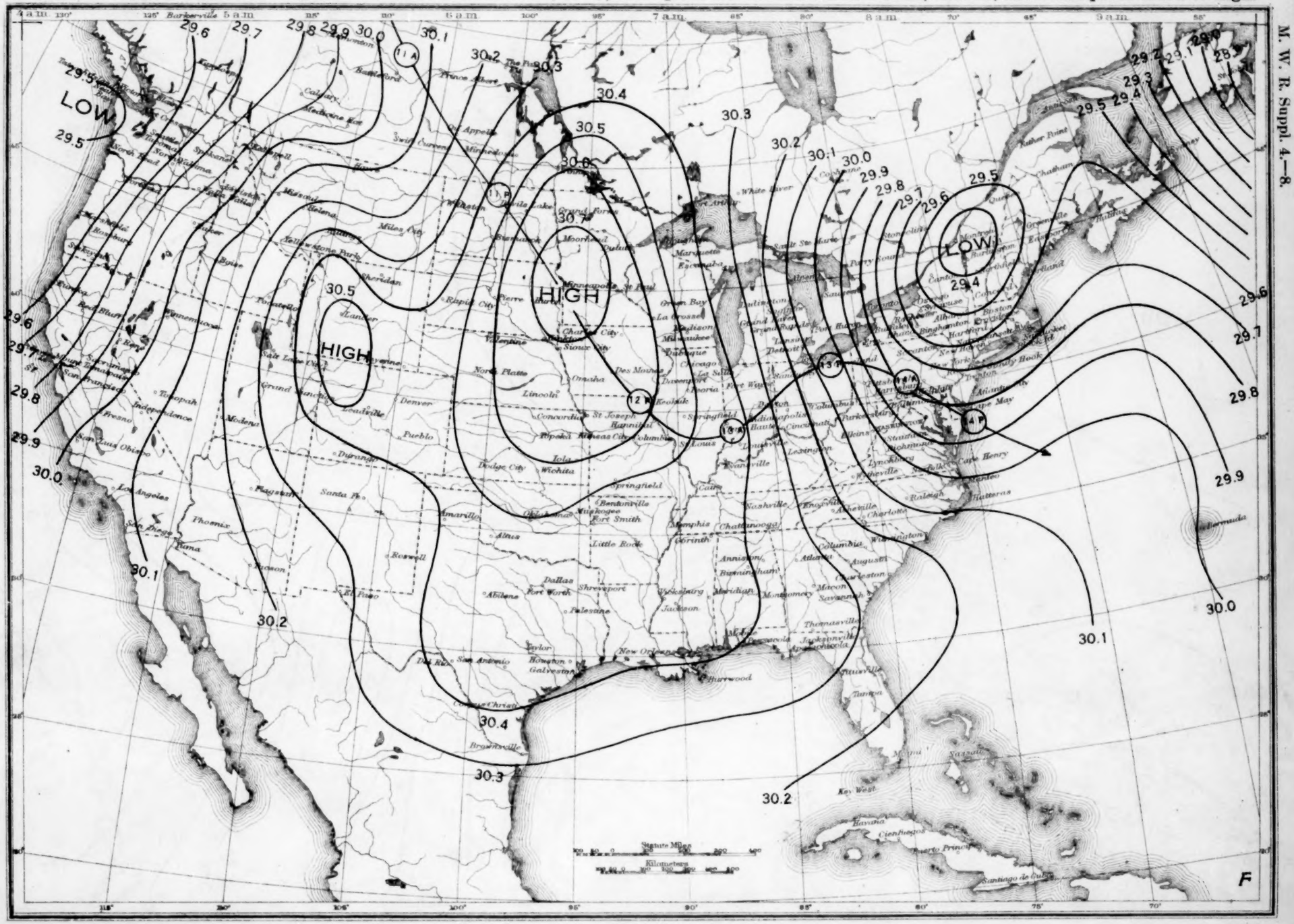

Chart 9.—Typical Alberta anticyclone (Summer) of July 22-26, 1913; with pressure distribution at 8 a. m., July 23, and subsequent track of high.

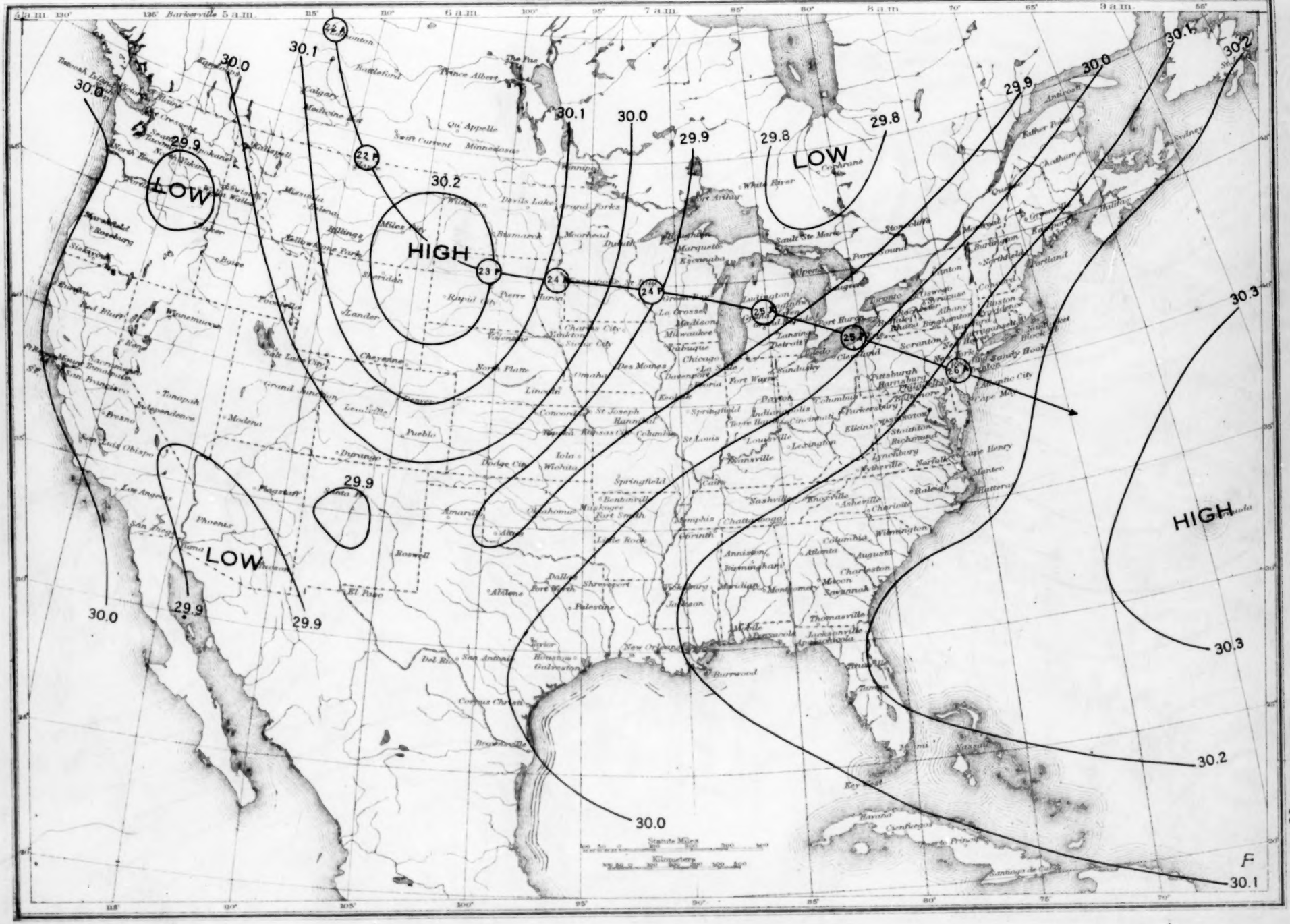

Chart 10.—Typical Plateau and Rocky Mountain anticyclone (Winter) of Dec. 27-29, 1908; with pressure distribution at 8 a. m., Dec. 27, and subsequent track of high.

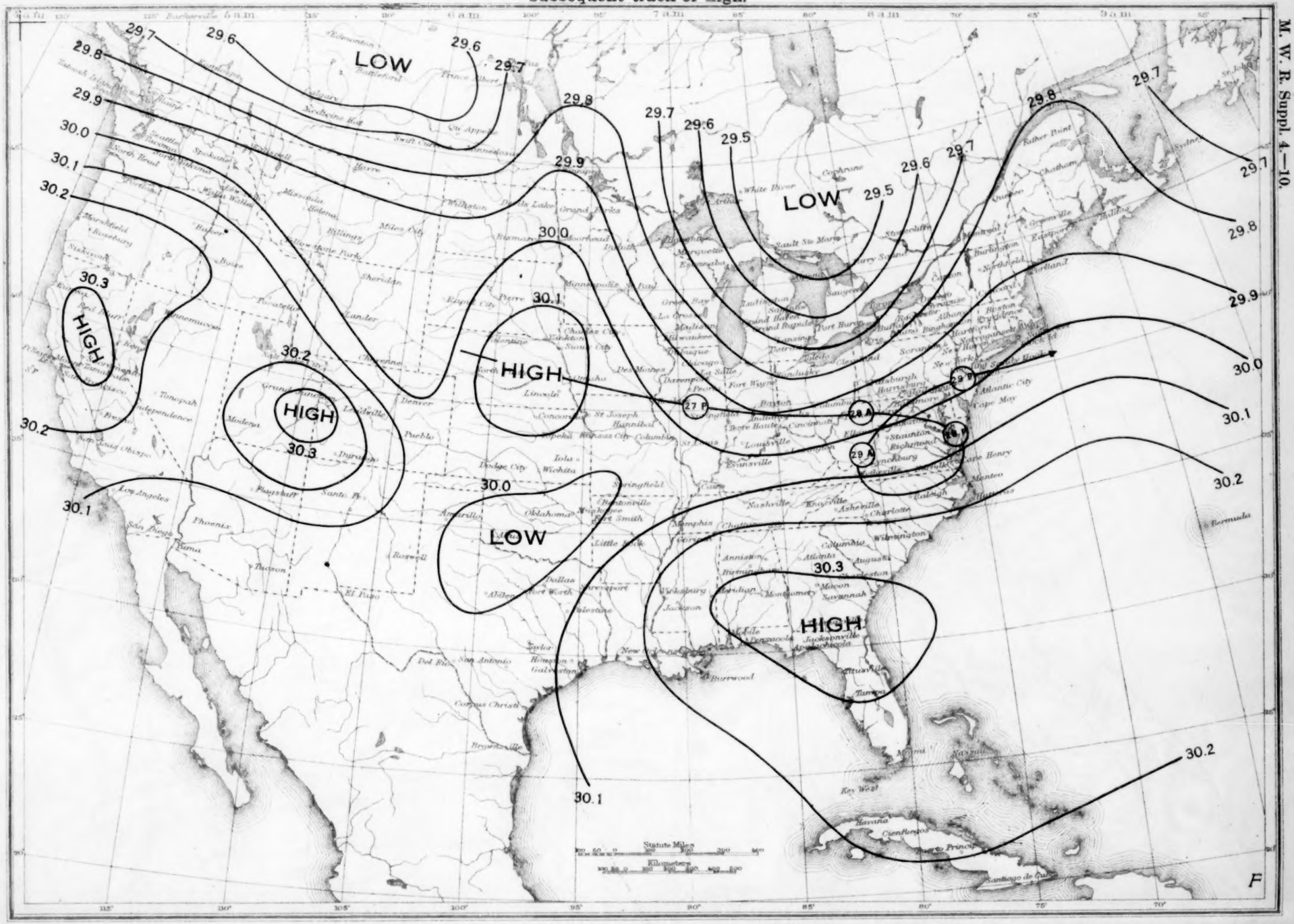

Chart 11.—Typical Plateau and Rocky Mountain anticyclone (Summer) of July 27-30, 1907; with pressure distribution at 8 a. m., July 28, and subsequent track of high.

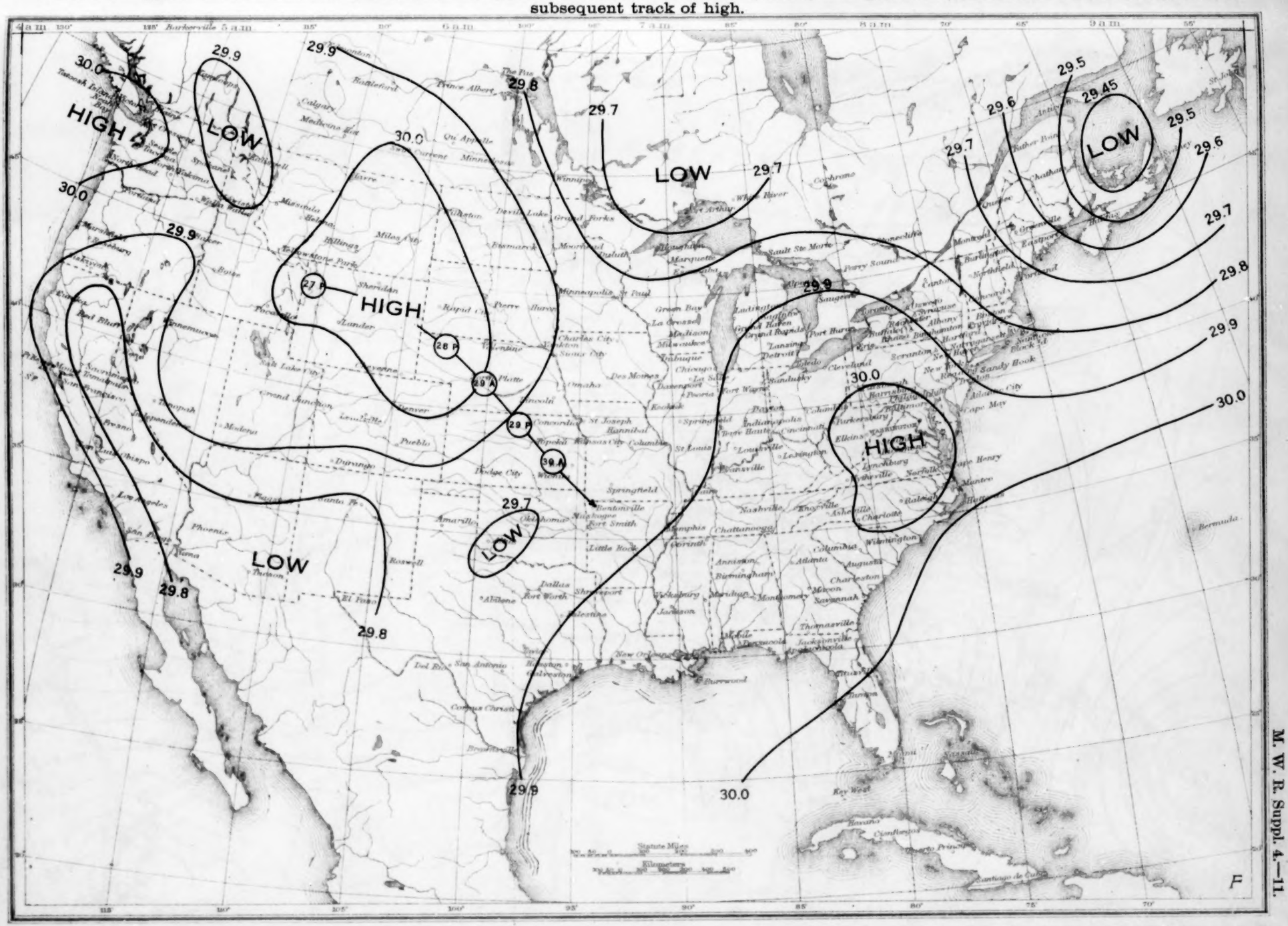

Chart 12.—Typical Hudson Bay anticyclone (Winter) of Jan. 19-20, 1908; with pressure distribution at 8 p. m., Jan. 19, and subsequent track of high.

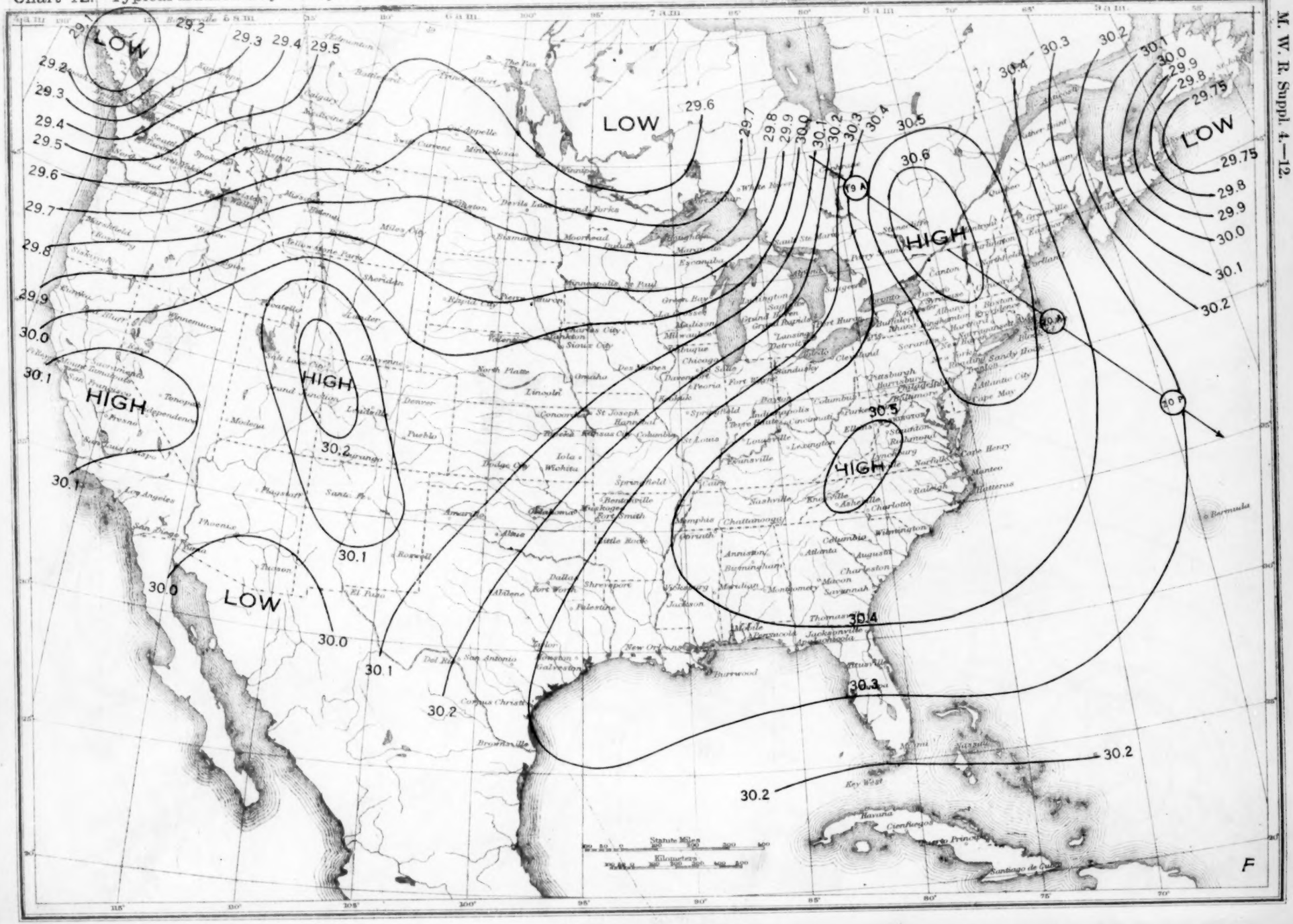

Chart 13.—Typical Hudson Bay anticyclone (Summer) of July 28-30, 1914; with pressure distribution at 8 a. m., July 29, and subsequent track of high.

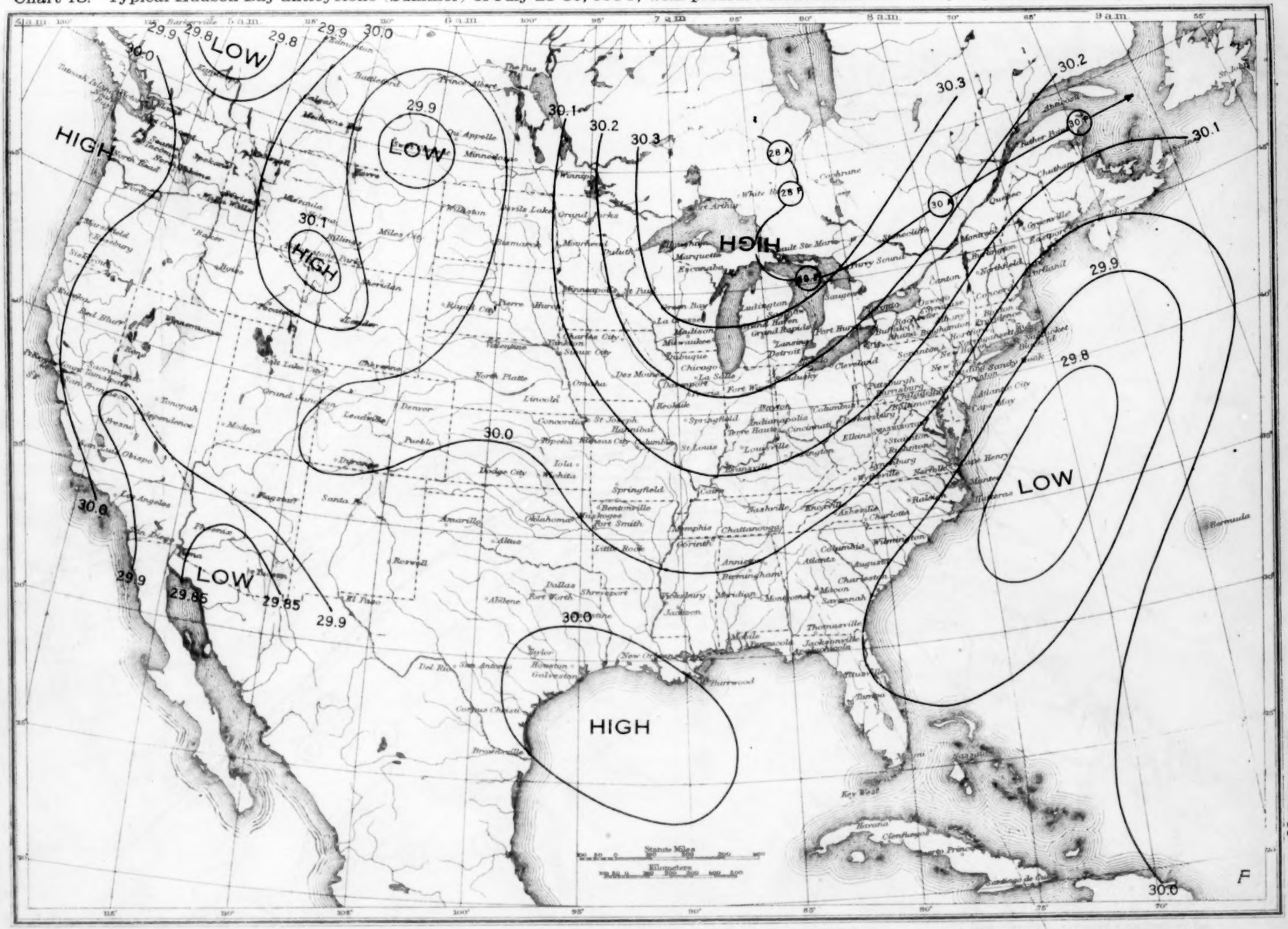

Chart 14.—Average 24-hour movement of anticyclones, by 5°-squares. January—North Pacific type.

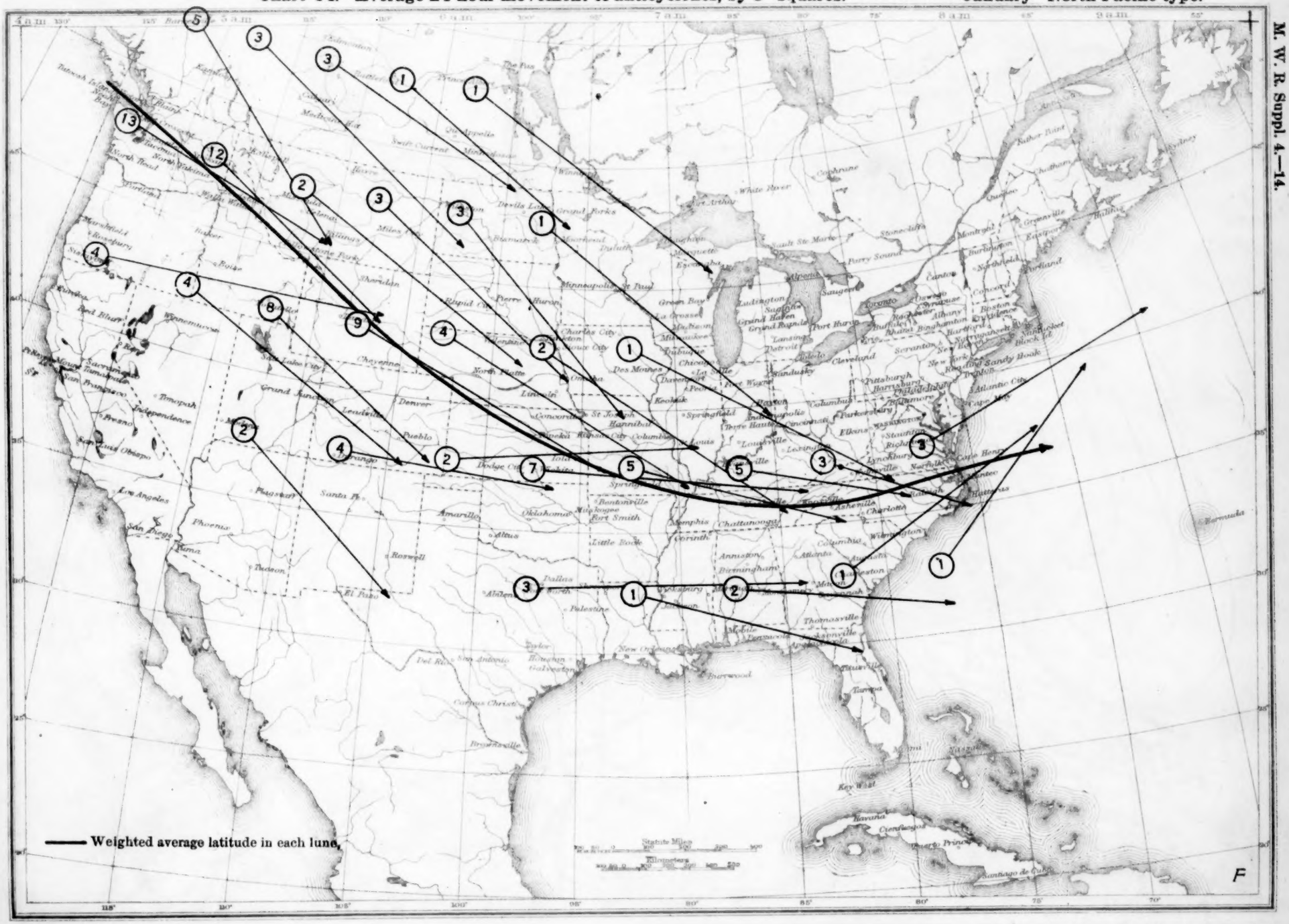

Chart 15.—Average 24-hour movement of anticyclones, by 5°-squares. January—South Pacific type.

F

Chart 16.—Average 24-hour movement of anticyclones, by 5°-squares. January—Alberta type.

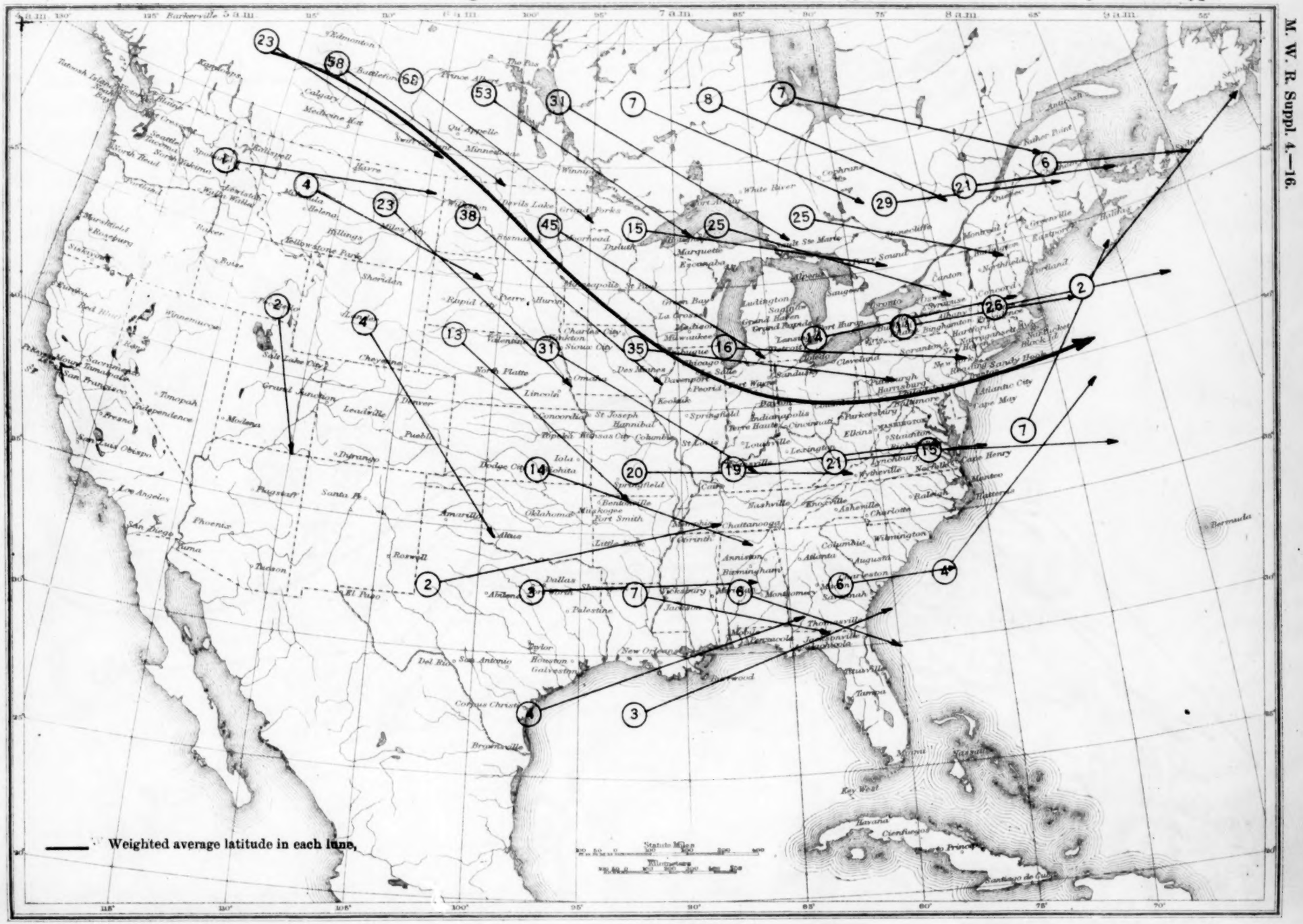

Chart 17.—Average 24-hour movement of anticyclones, by 5°-squares. January—Plateau and Rocky Mountain type.

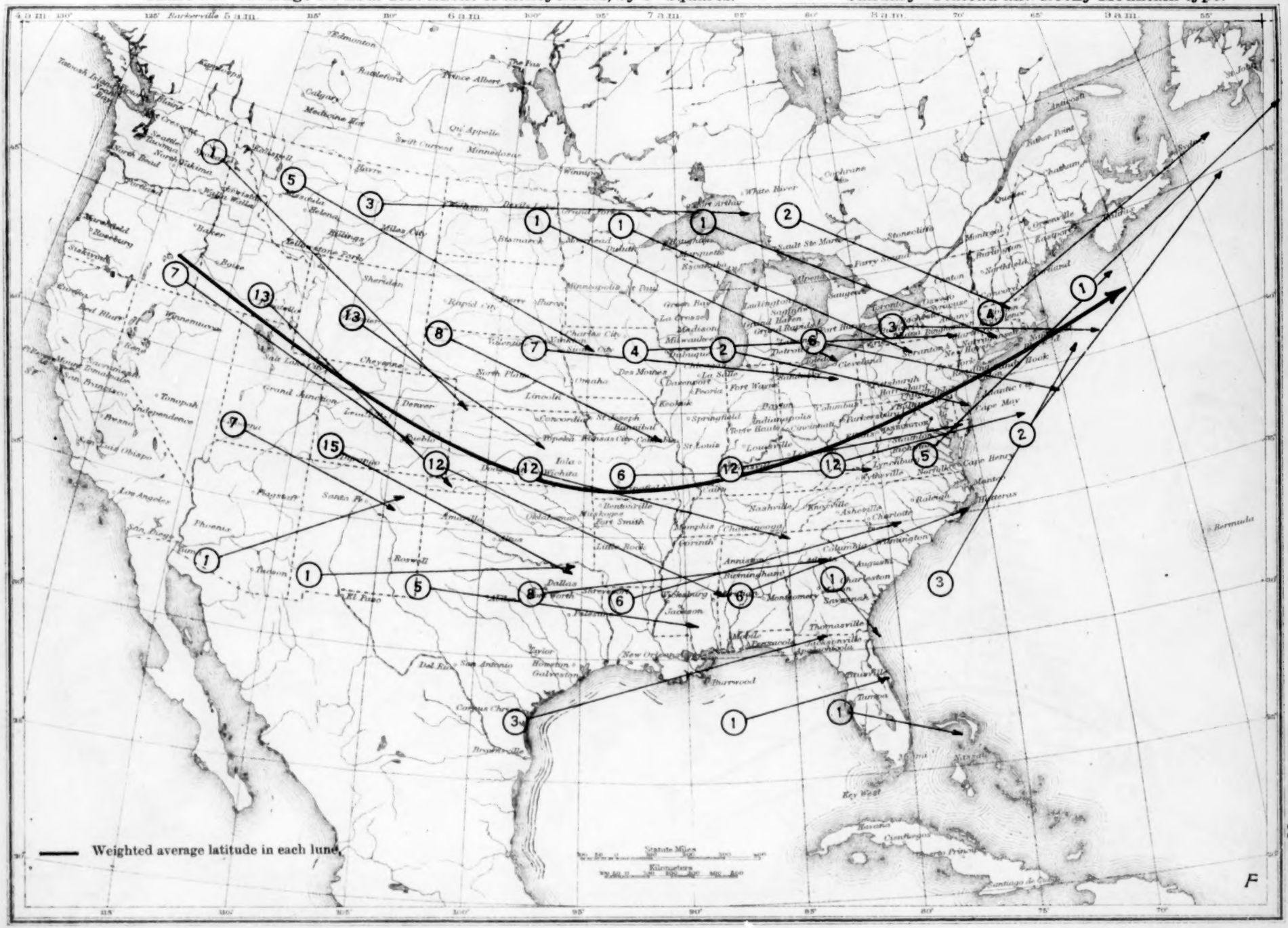

Chart 18.—Average 24-hour movement of anticyclones, by 5°-squares. January—Hudson Bay type.

Chart 19.—Average 24-hour movement of anticyclones, by 5°-squares. February—North Pacific type.

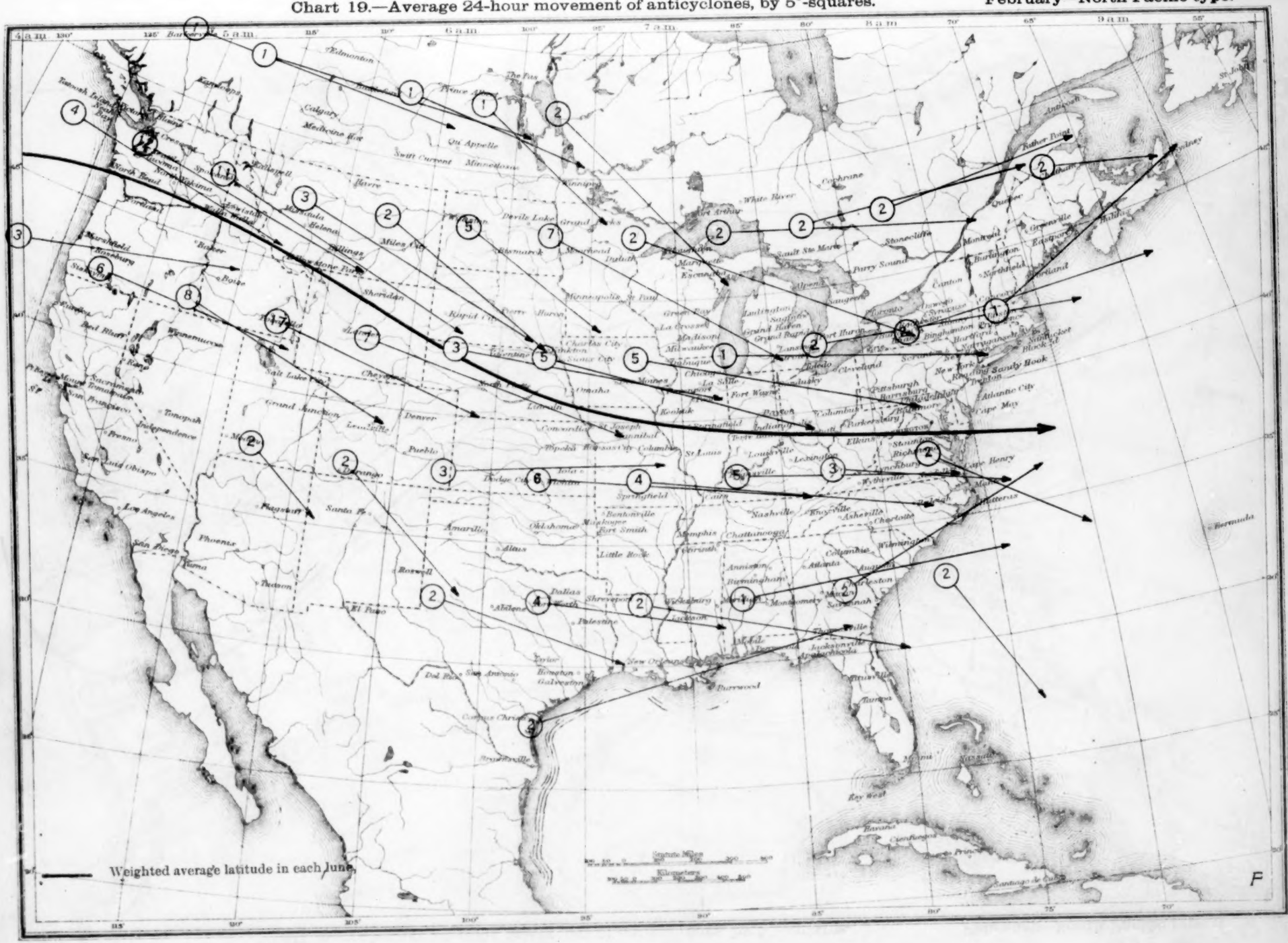

Chart 20.—Average 24-hour movement of anticyclones, by 5°-squares. February—South Pacific type.

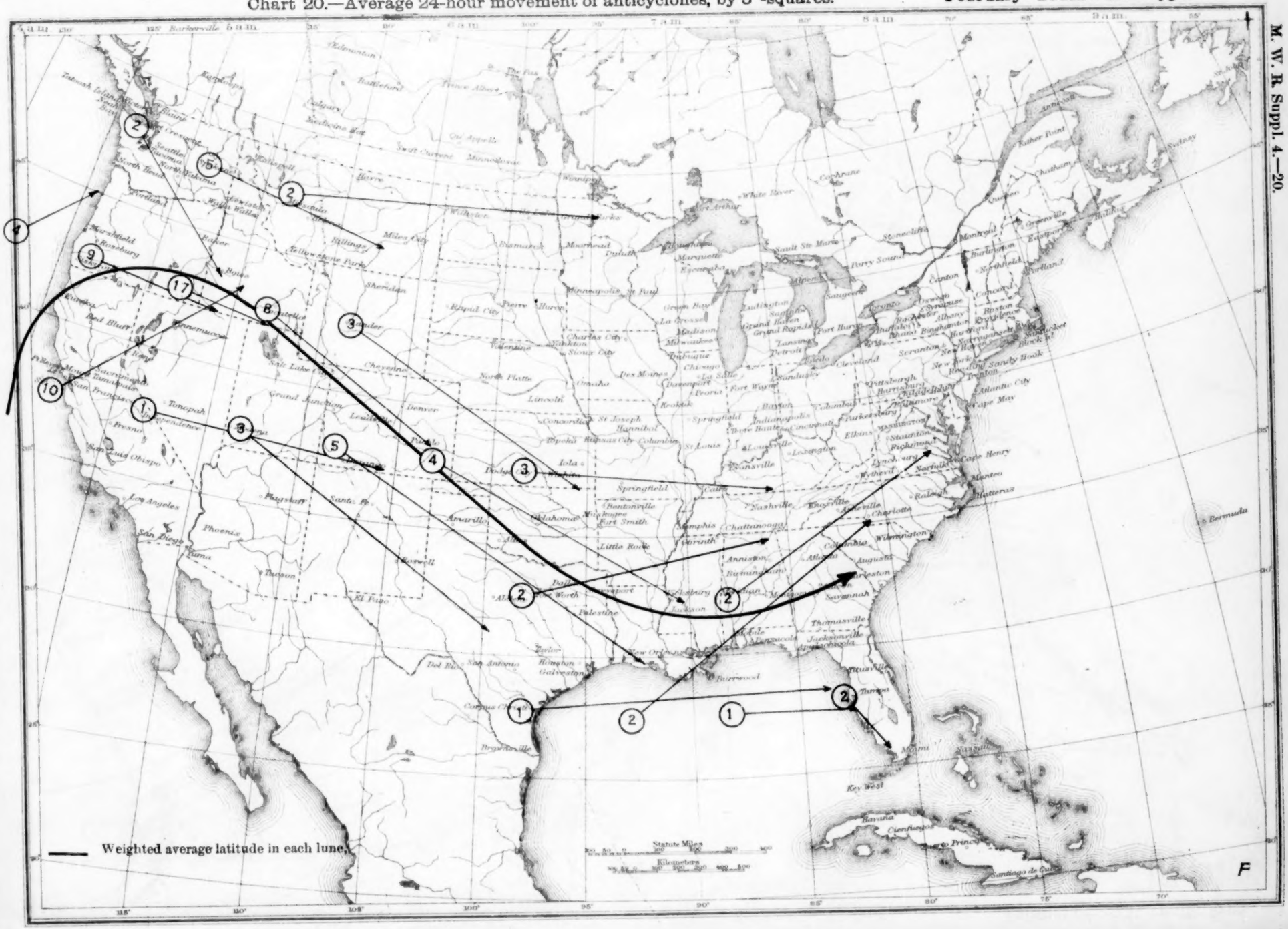

Chart 21.—Average 24-hour movement of anticyclones, by 5°-squares. February—Alberta type.

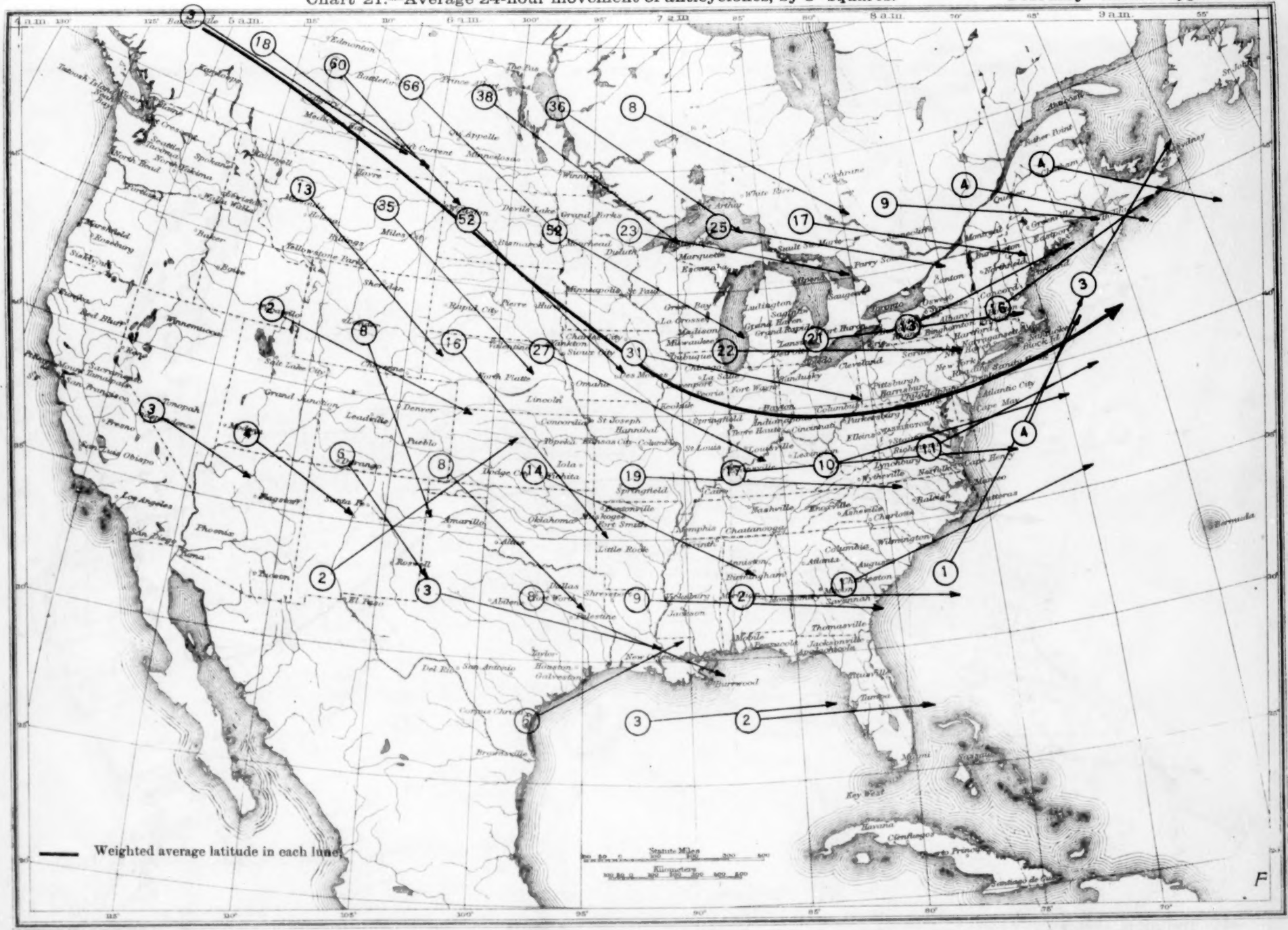

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Chart 22.—Average 24-hour movement of anticyclones, by 5°-squares. February—Plateau and Rocky Mountain type.

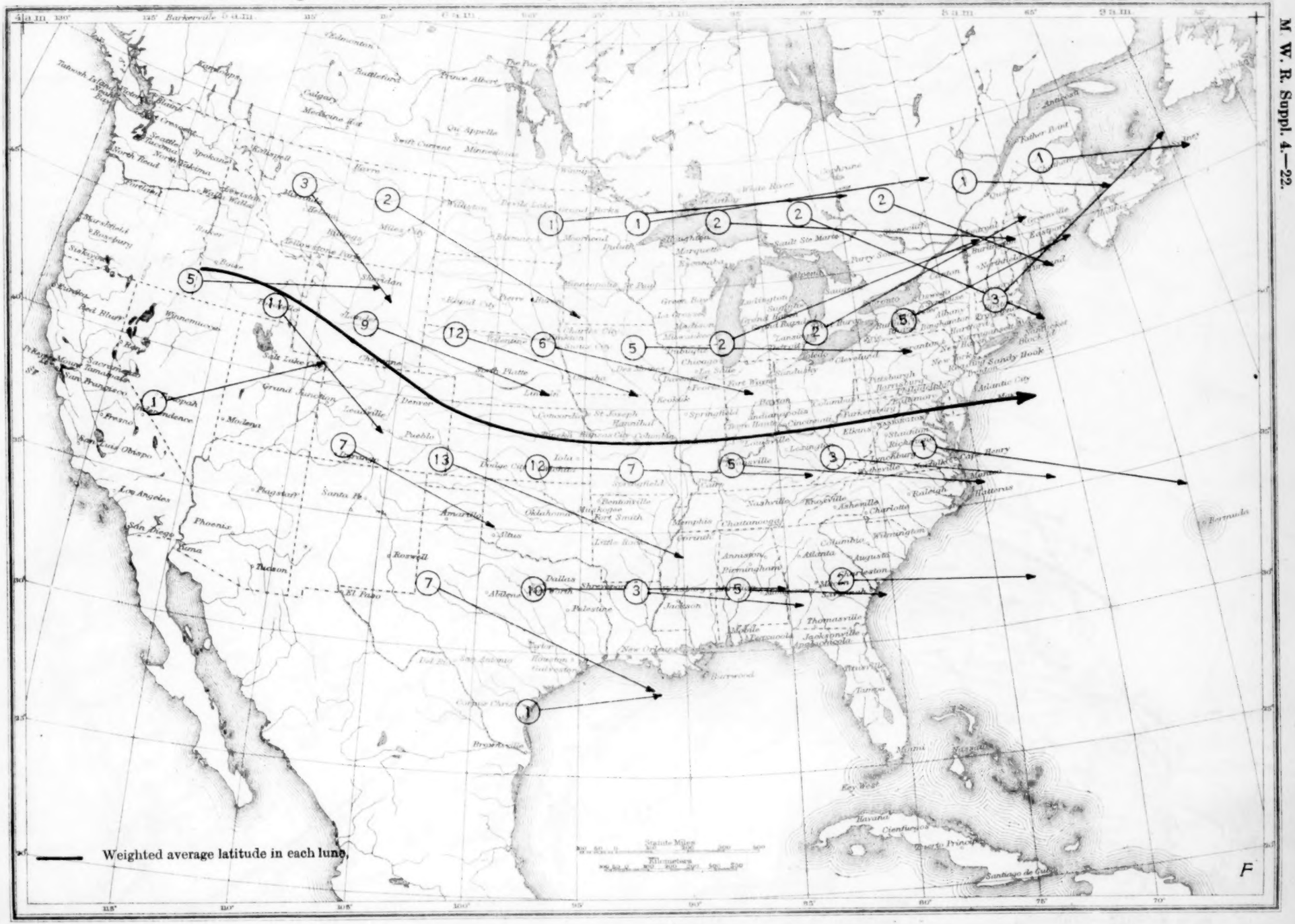

Chart 23.—Average 24-hour movement of anticyclones, by 5°-squares. February—Hudson Bay type.

F

Chart 24.—Average 24-hour movement of anticyclones, by 5°-squares. March—North Pacific type.

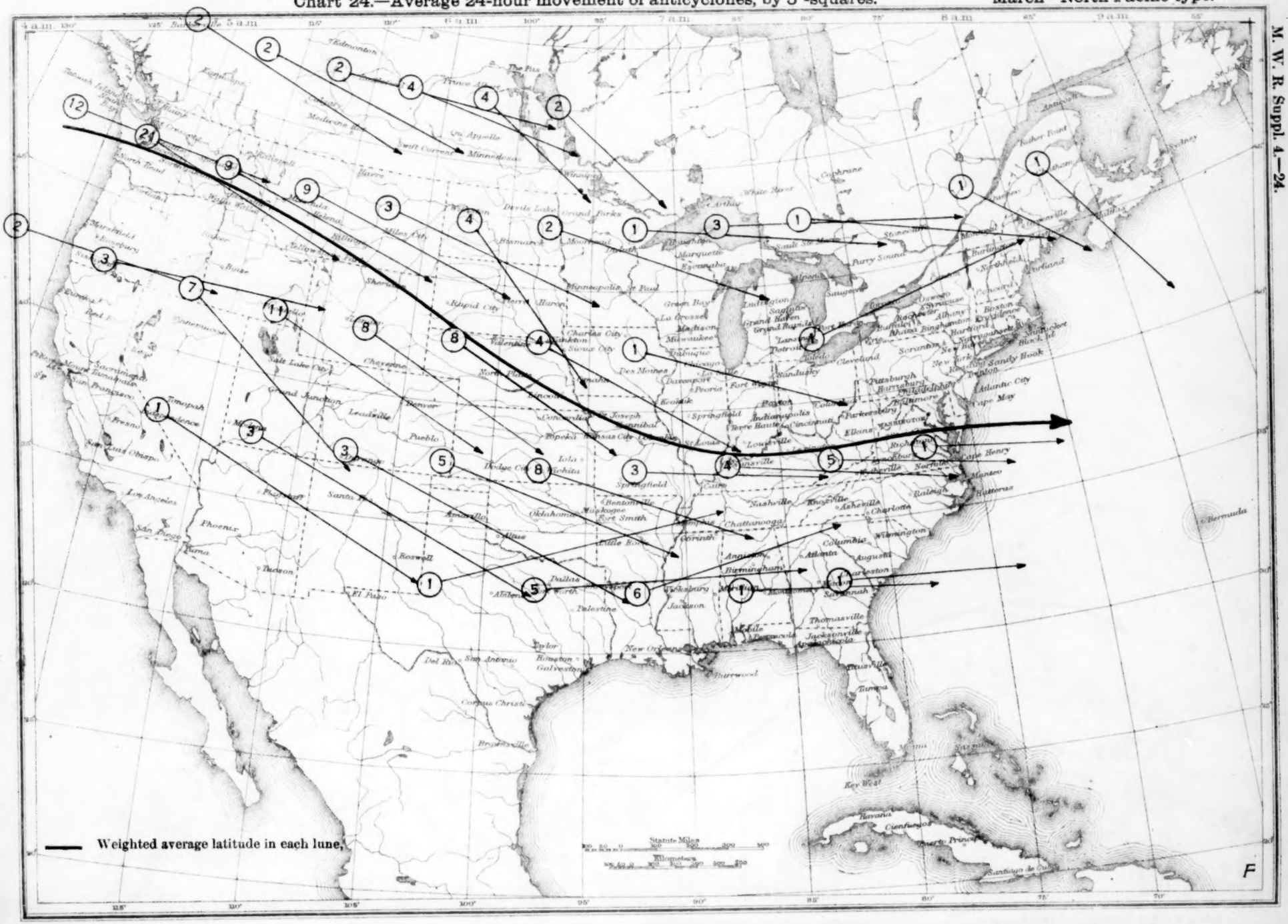

Chart 25.—Average 24-hour movement of anticyclones, by 5°-squares. March—South Pacific type.

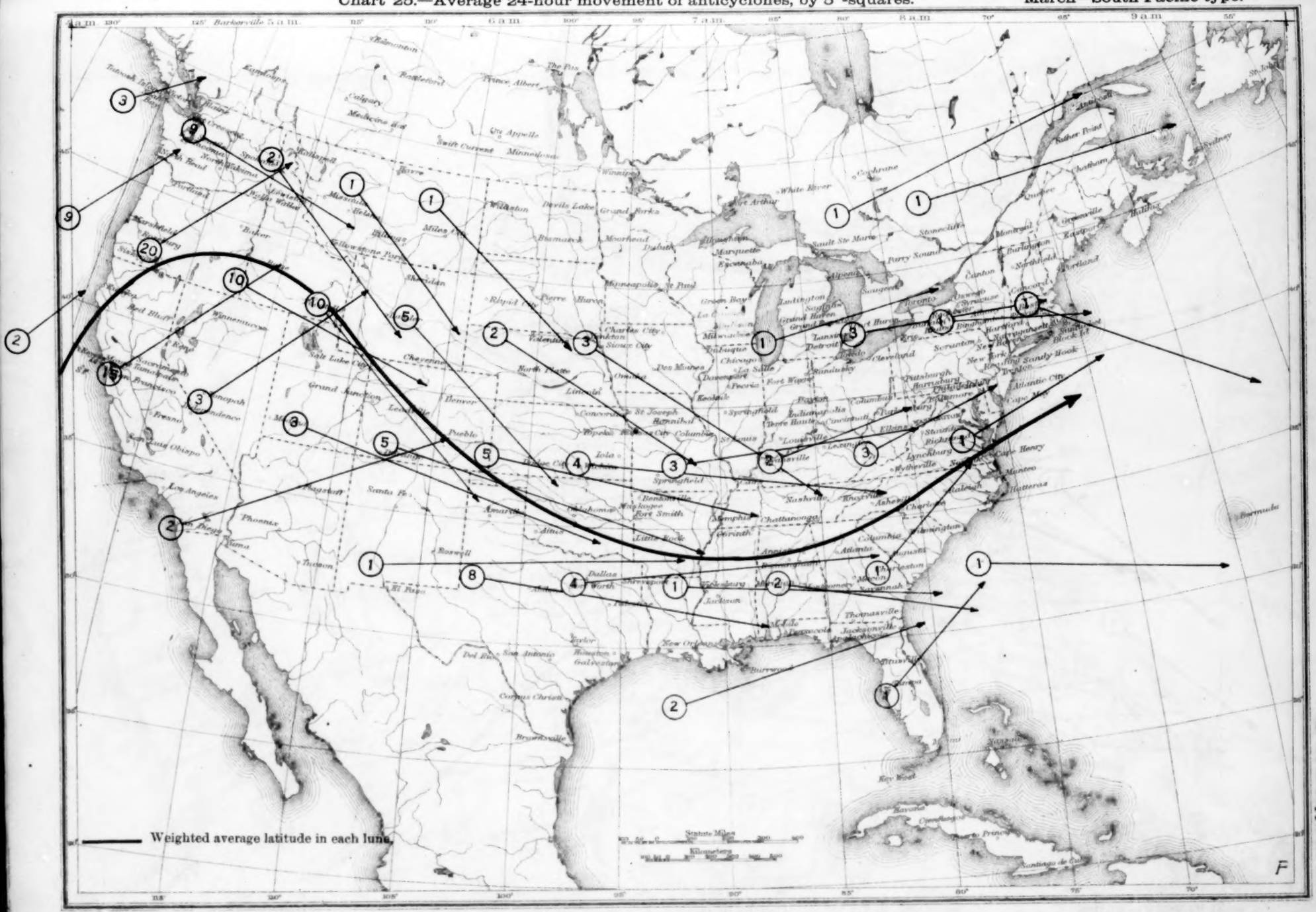

Chart 26.—Average 24-hour movement of anticyclones, by 5°-squares. March—Alberta type.

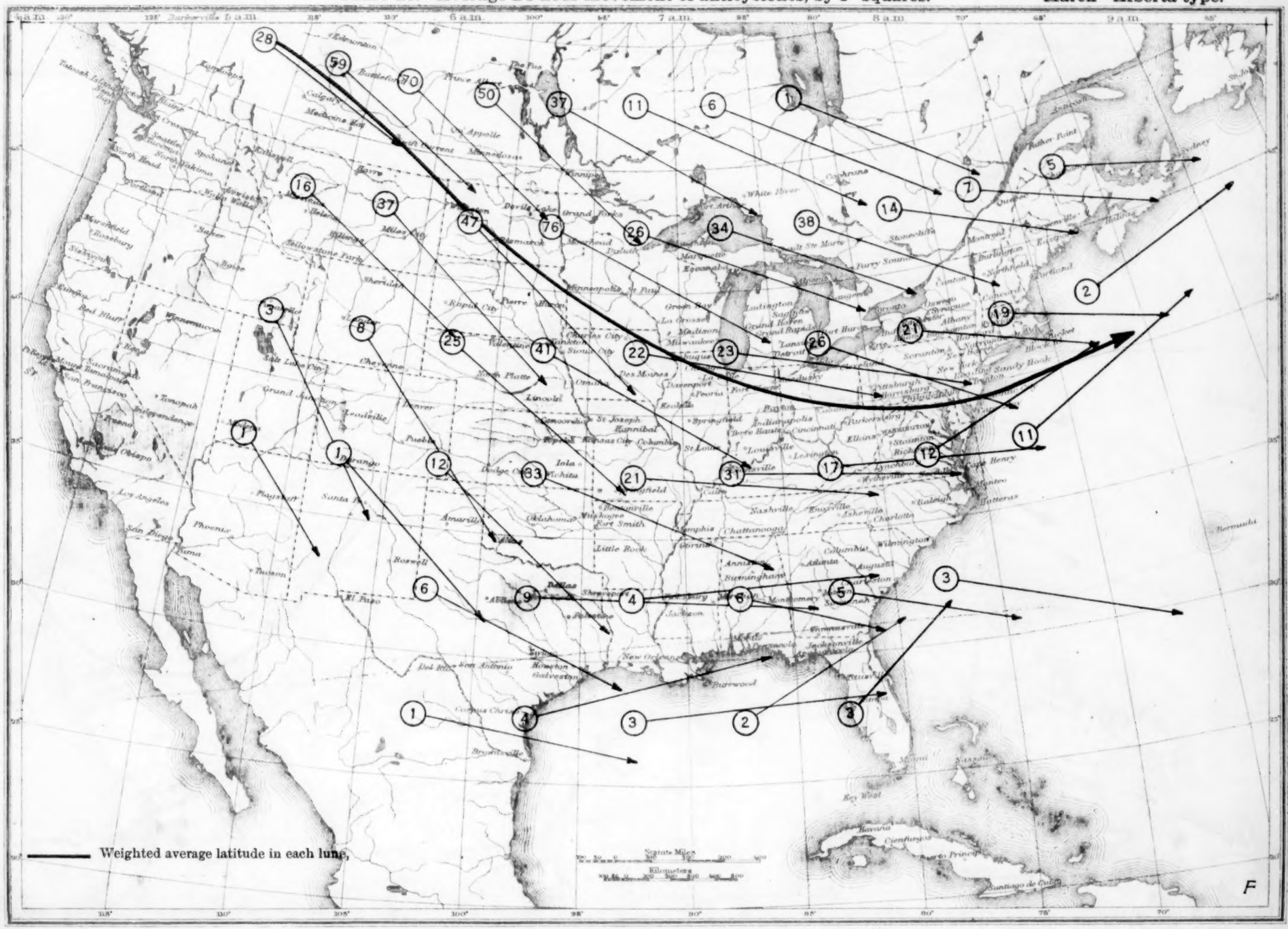

Chart 27.—Average 24-hour movement of anticyclones, by 5°-squares. March—Plateau and Rocky Mountain type.

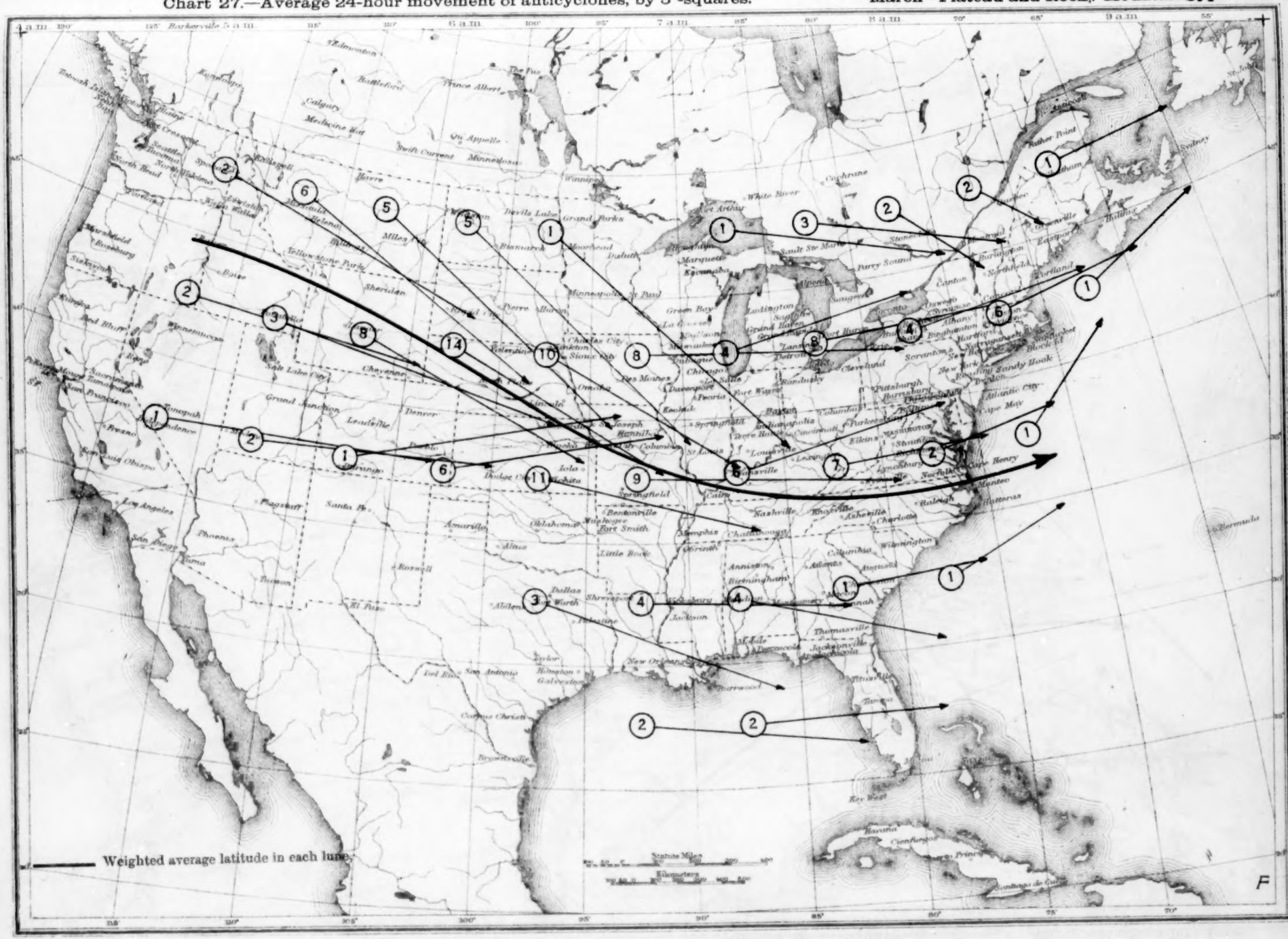

Chart 28.—Average 24-hour movement of anticyclones, by 5°-squares. March—Hudson Bay type

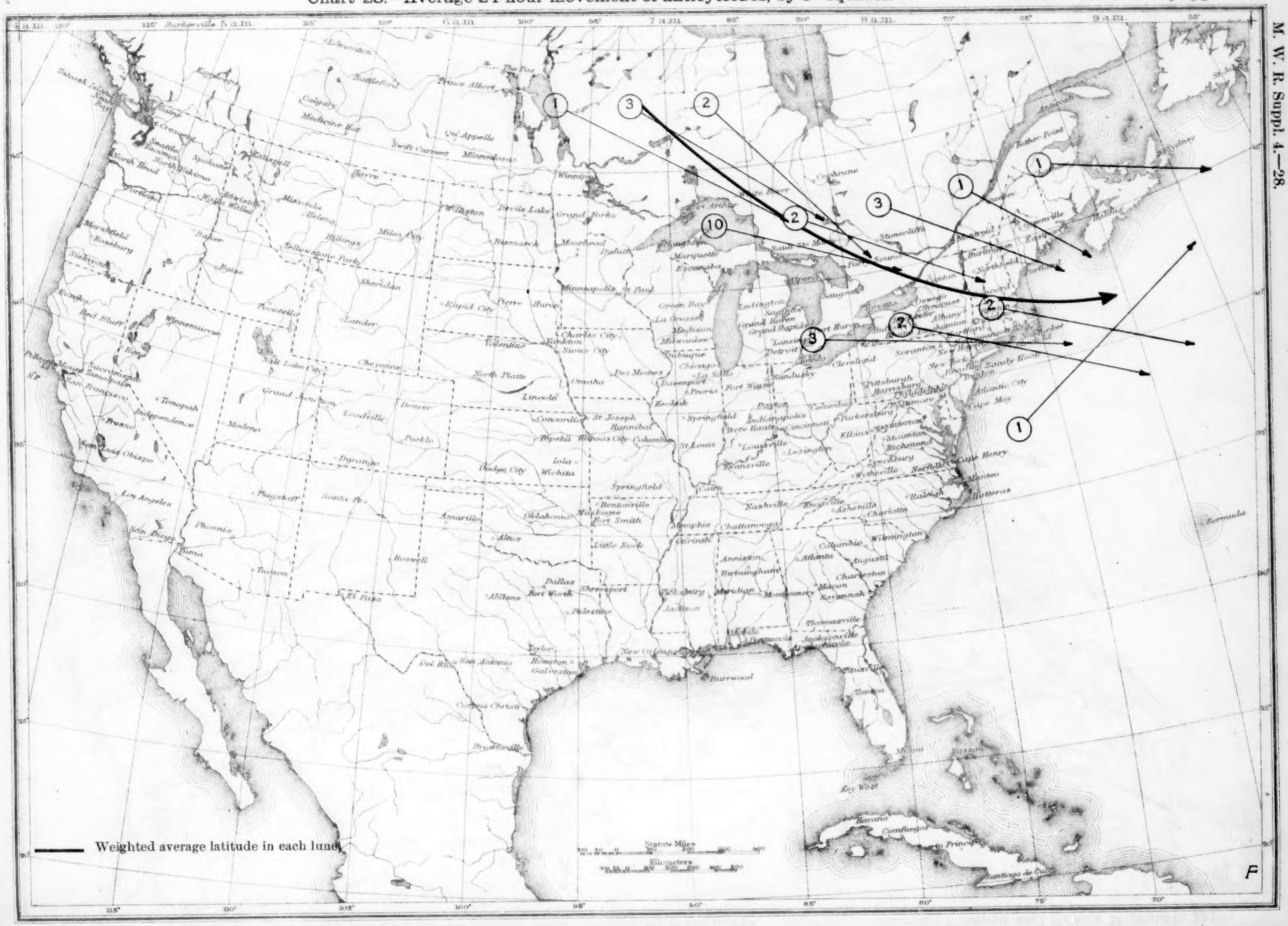

Chart 29.—Average 24-hour movement of anticyclones, by 5°-squares. April—North Pacific type.

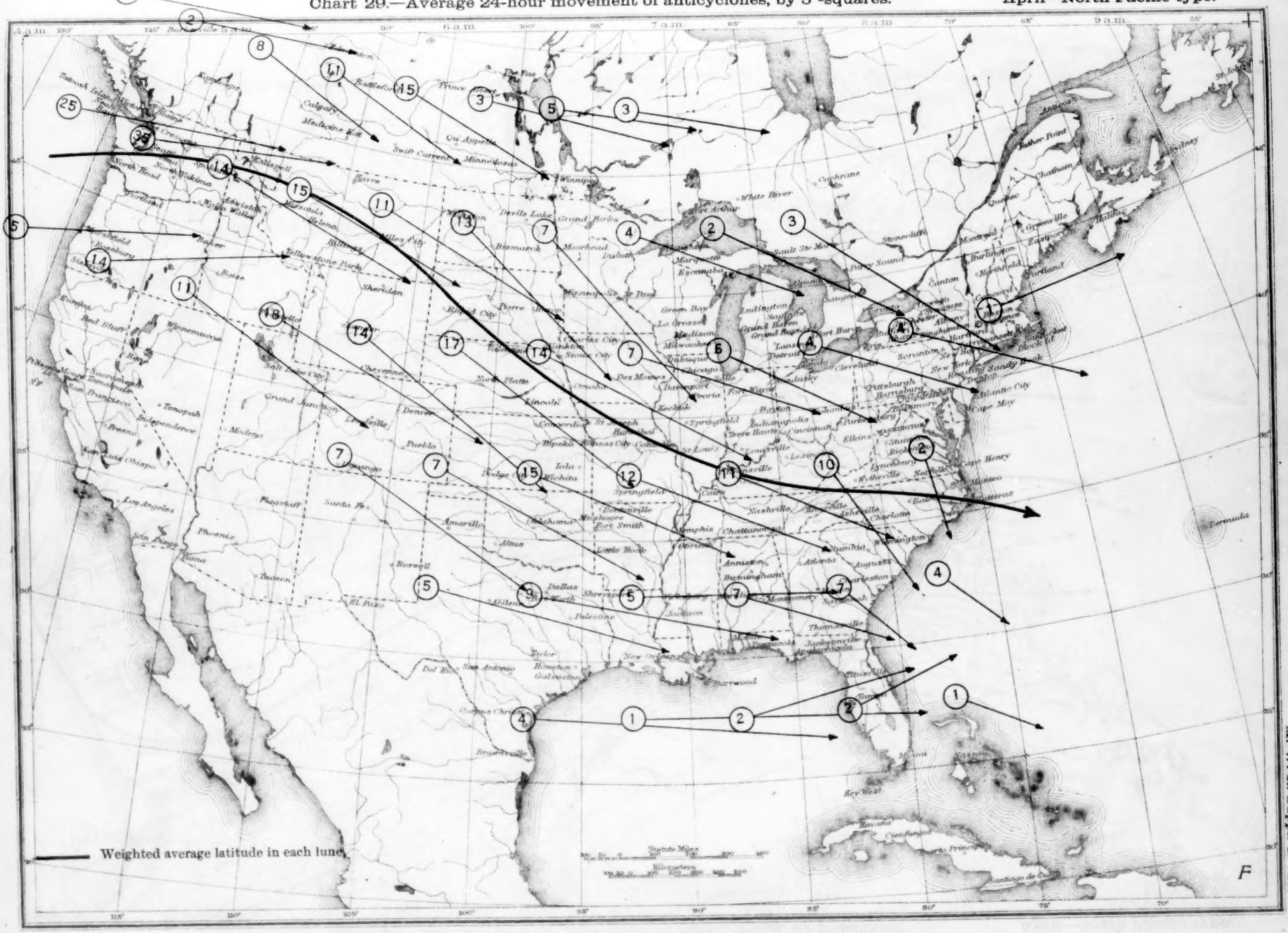

Chart 30.—Average 24-hour movement of anticyclones, by 5°-squares. April—South Pacific type.

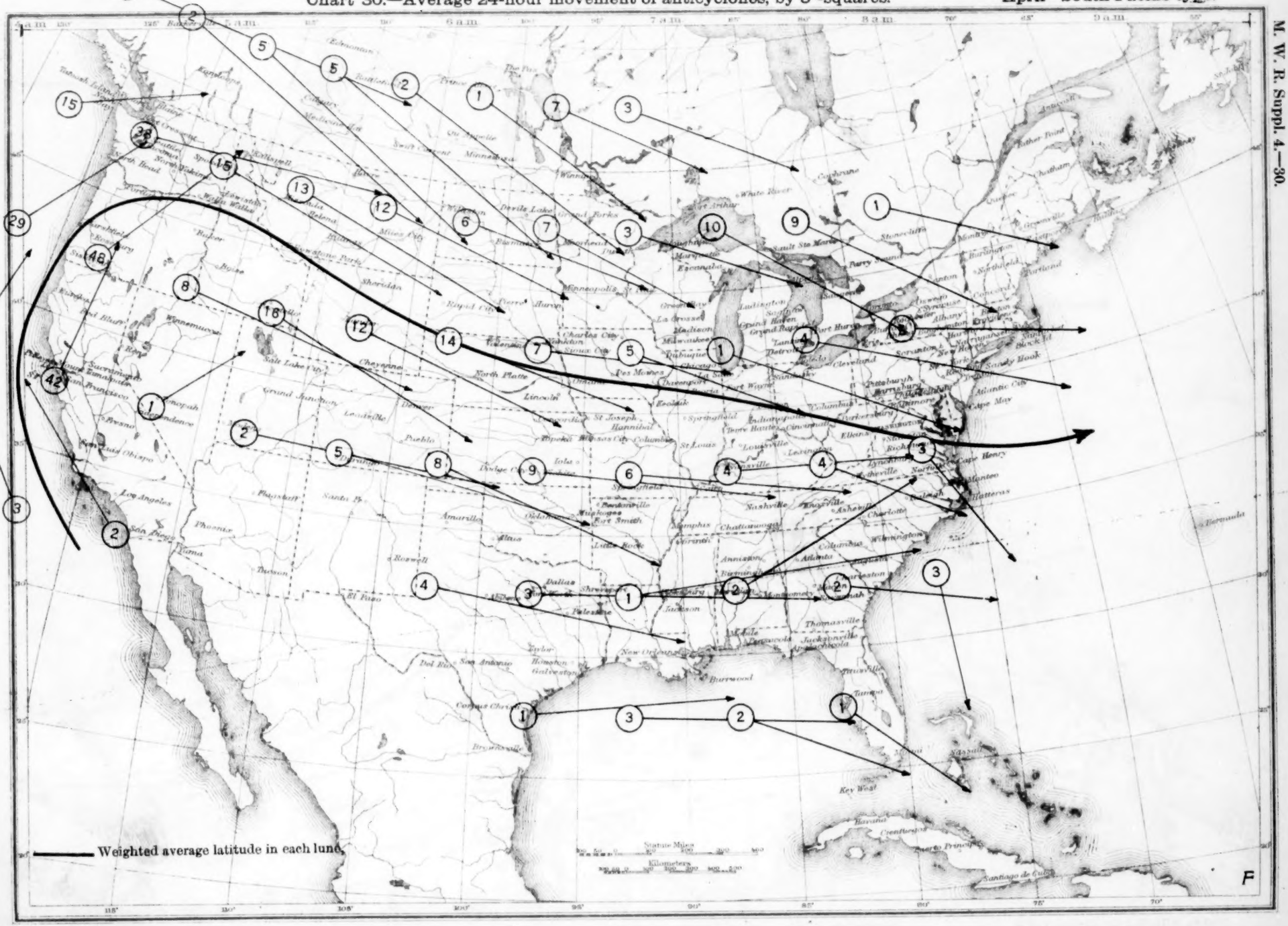

Chart 31.—Average 24-hour movement of anticyclones, by 5°-squares. **April—Alberta type.**

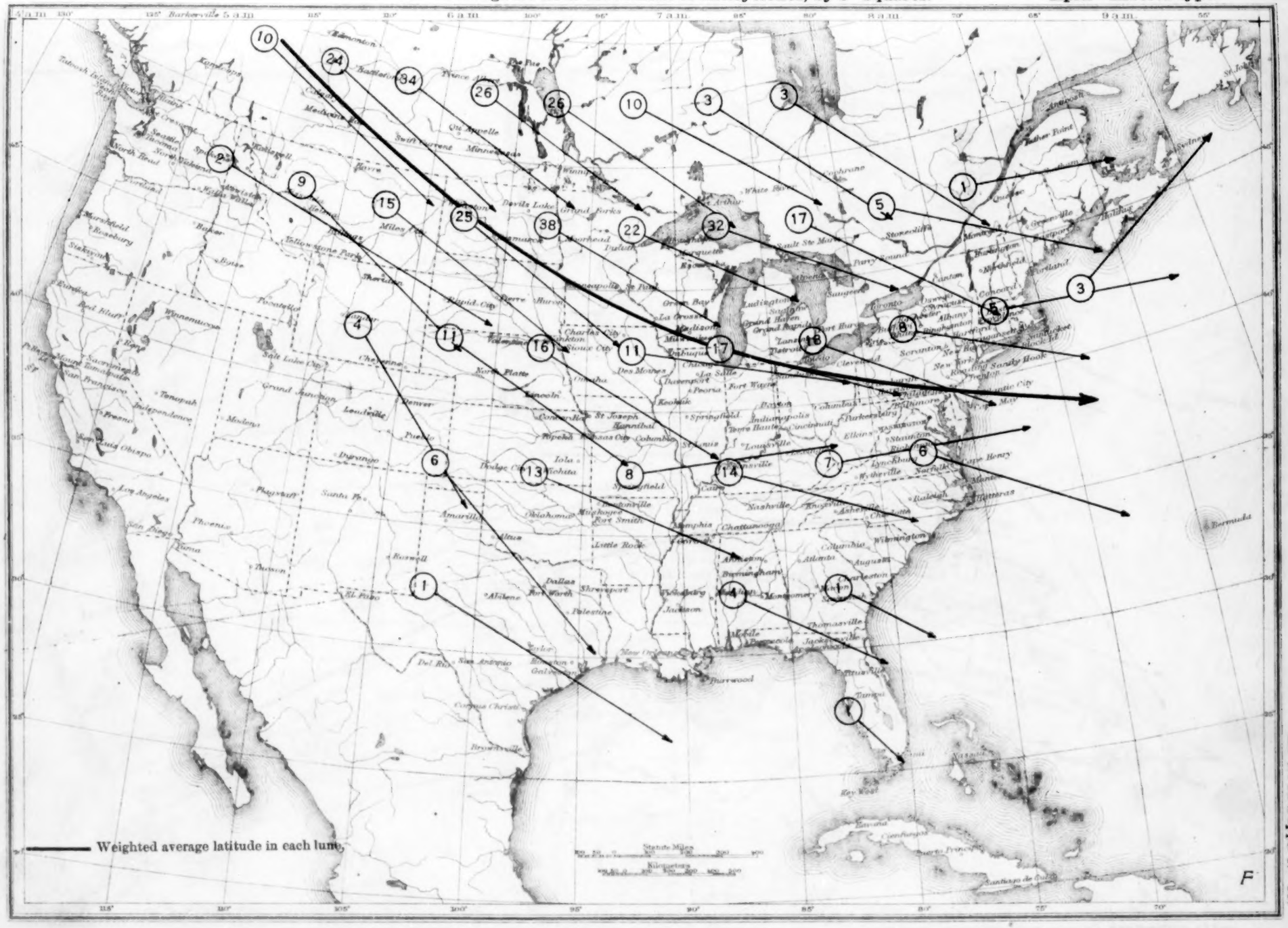

Chart 32.—Average 24-hour movement of anticyclones, by 5°-squares. April—Plateau and Rocky Mountain type.

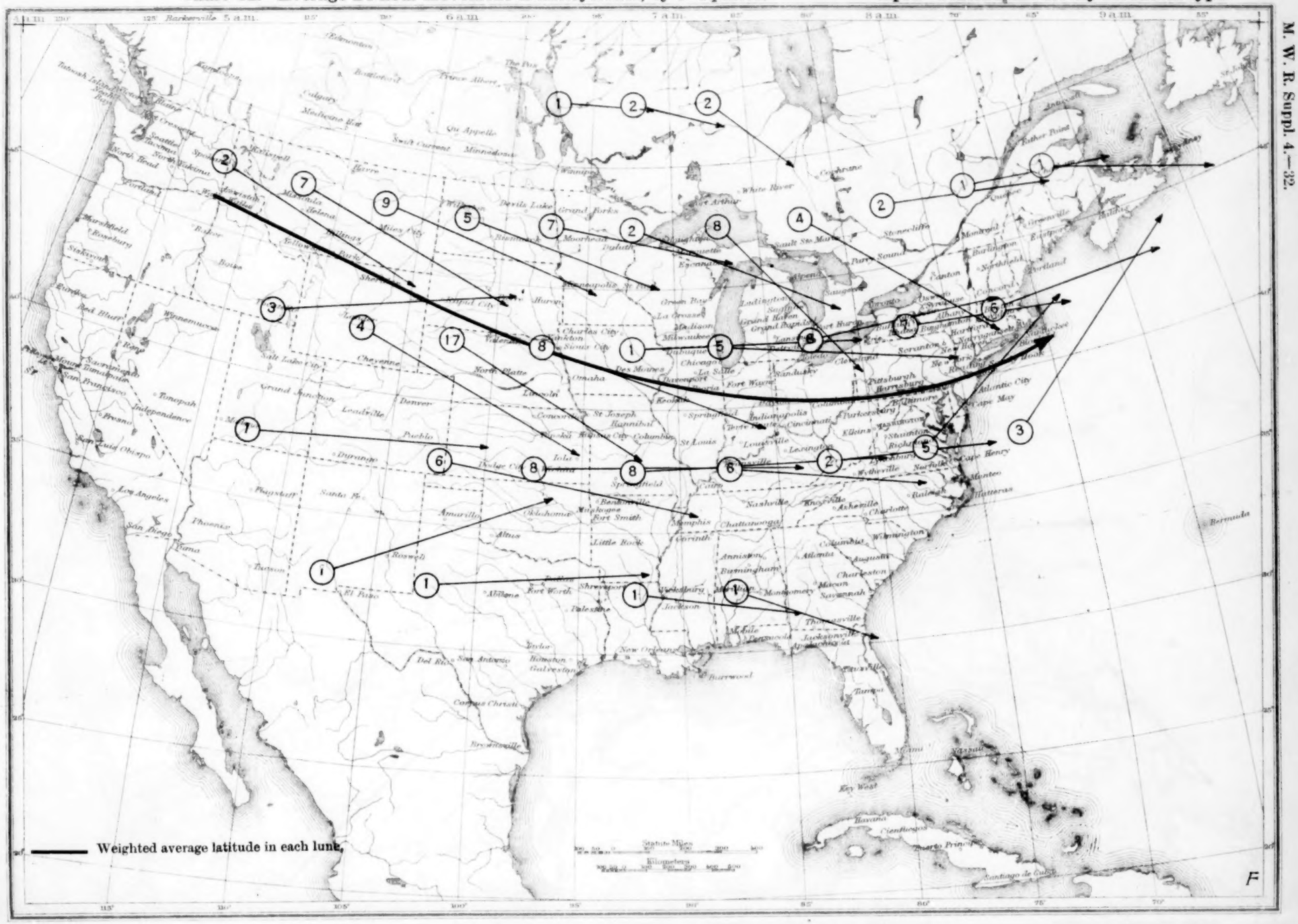

Chart 33.—Average 24-hour movement of anticyclones, by 5°-squares. April—Hudson Bay type.

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Chart 34.—Average 24-hour movement of anticyclones, by 5°-squares. May—North Pacific type.

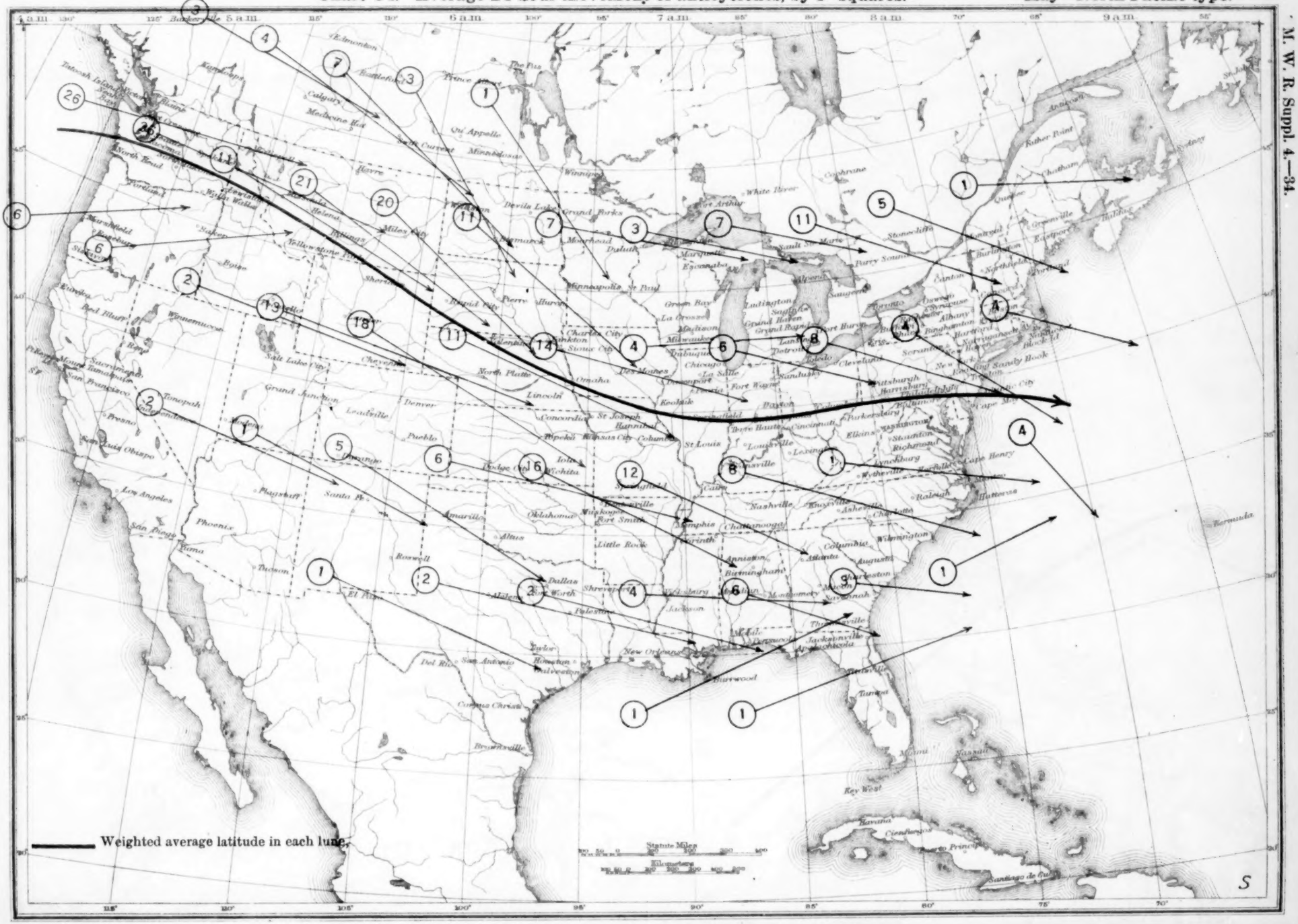

Chart 35.—Average 24-hour movement of anticyclones, by 5°-squares. May—South Pacific type.

Chart 36.—Average 24-hour movement of anticyclones, by 5°-squares. May—Alberta type.

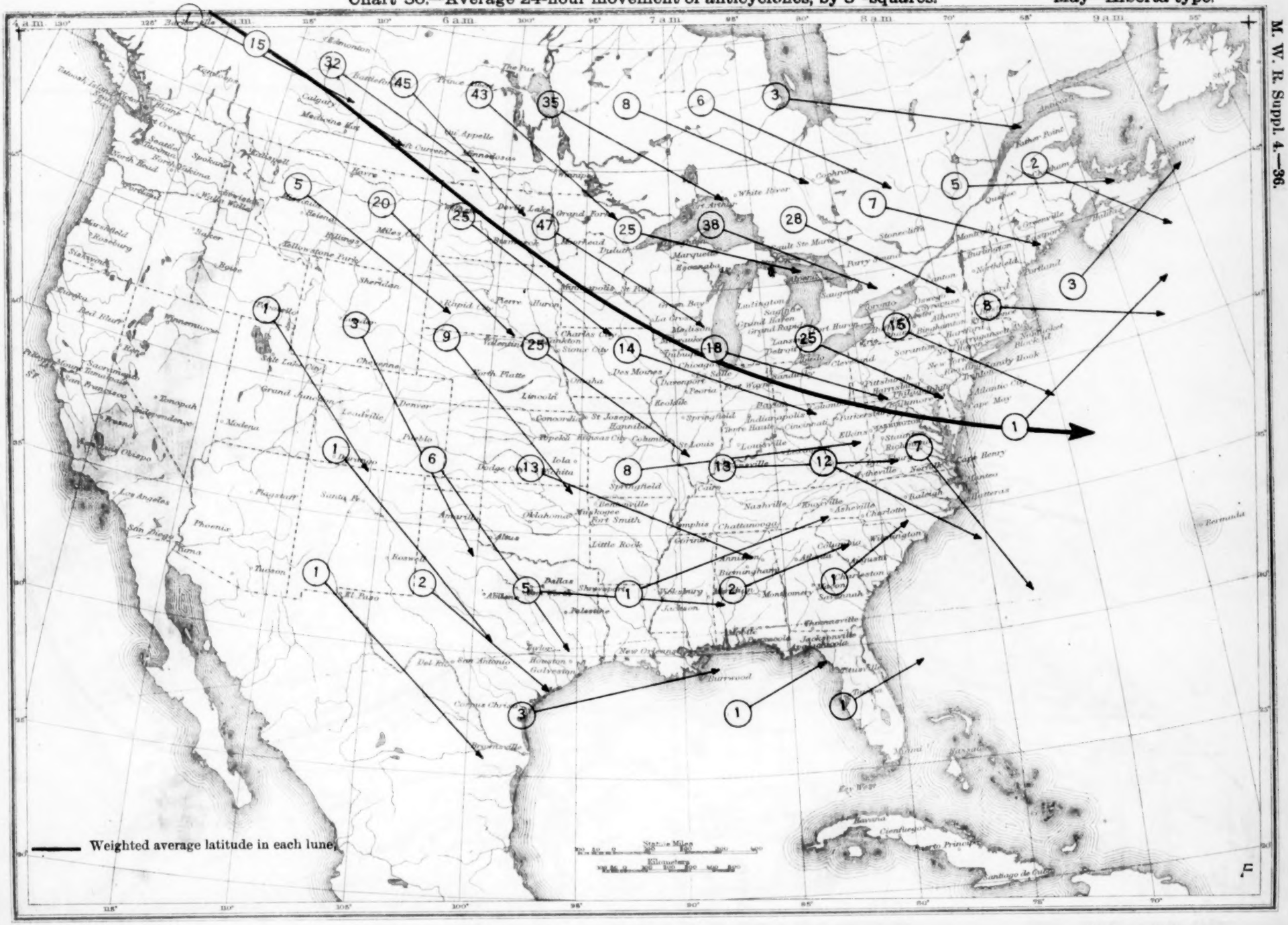

Chart 37.—Average 24-hour movement of anticyclones, by 5°-squares. May—Plateau and Rocky Mountain type.

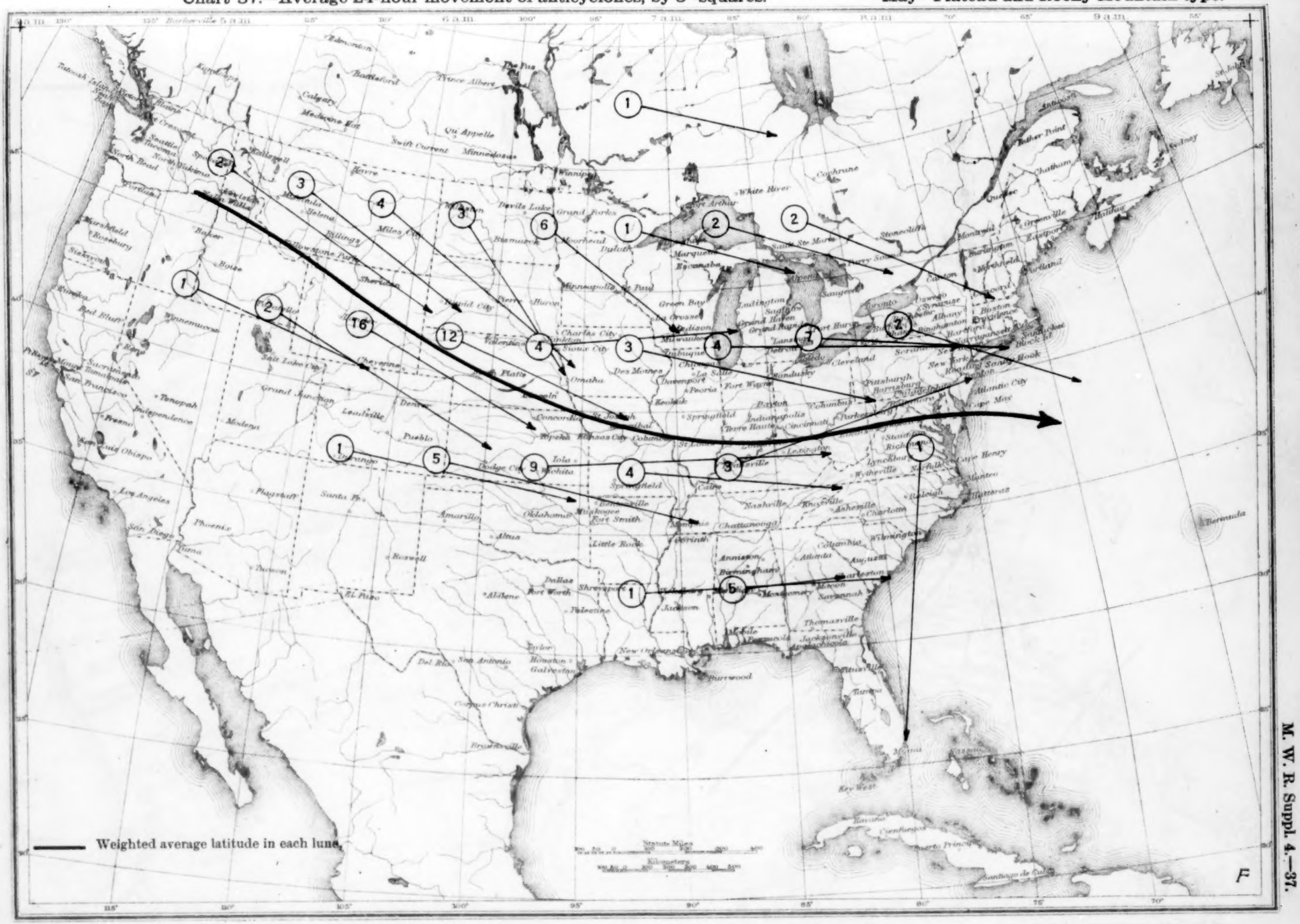

Chart 38.—Average 24-hour movement of anticyclones, by 5°-squares. May—Hudson Bay type.

Chart 39.—Average 24-hour movement of anticyclones, by 5°-squares. June—North Pacific type.

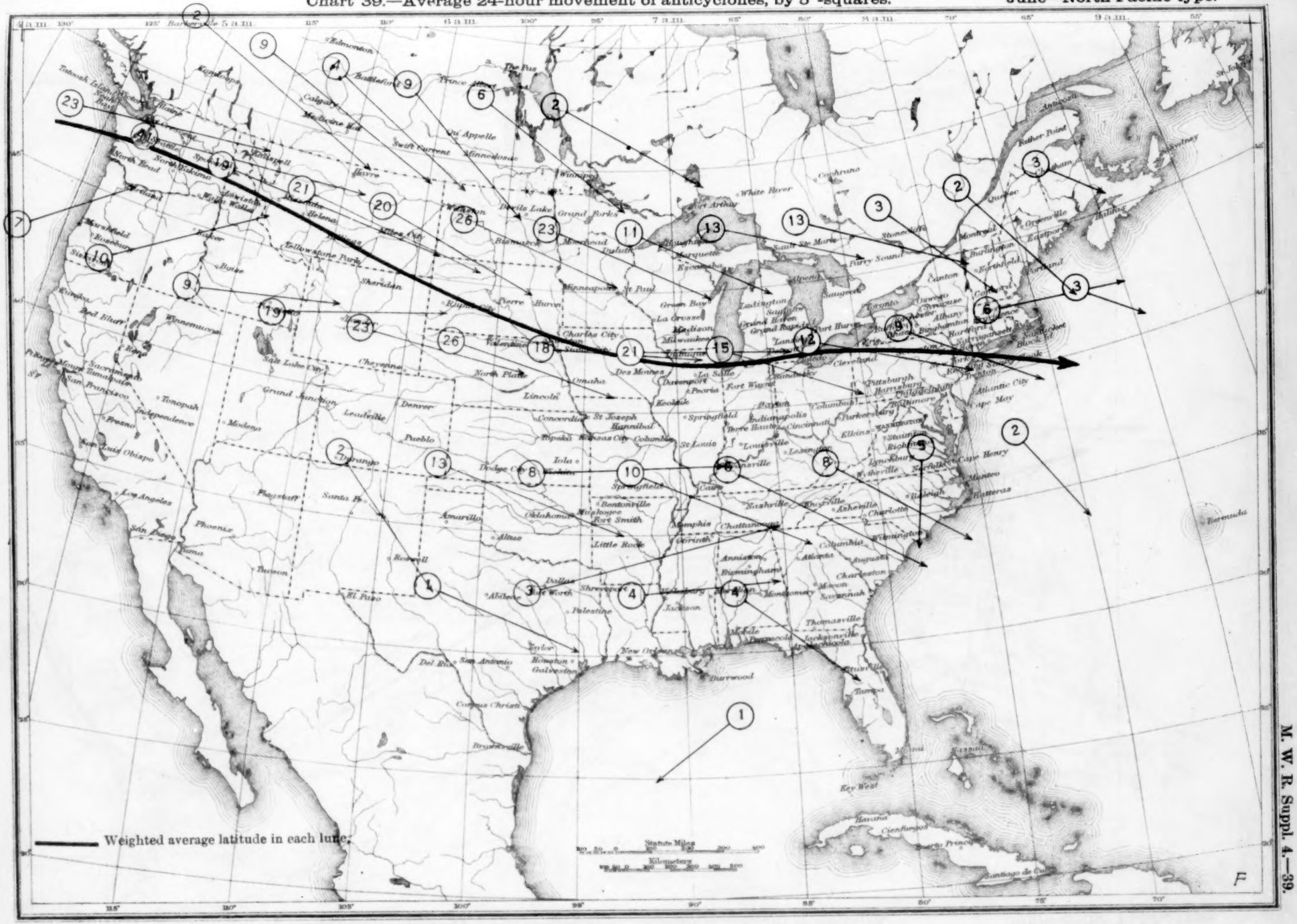

Chart 40.—Average 24-hour movement of anticyclones, by 5°-squares. June—South Pacific type.

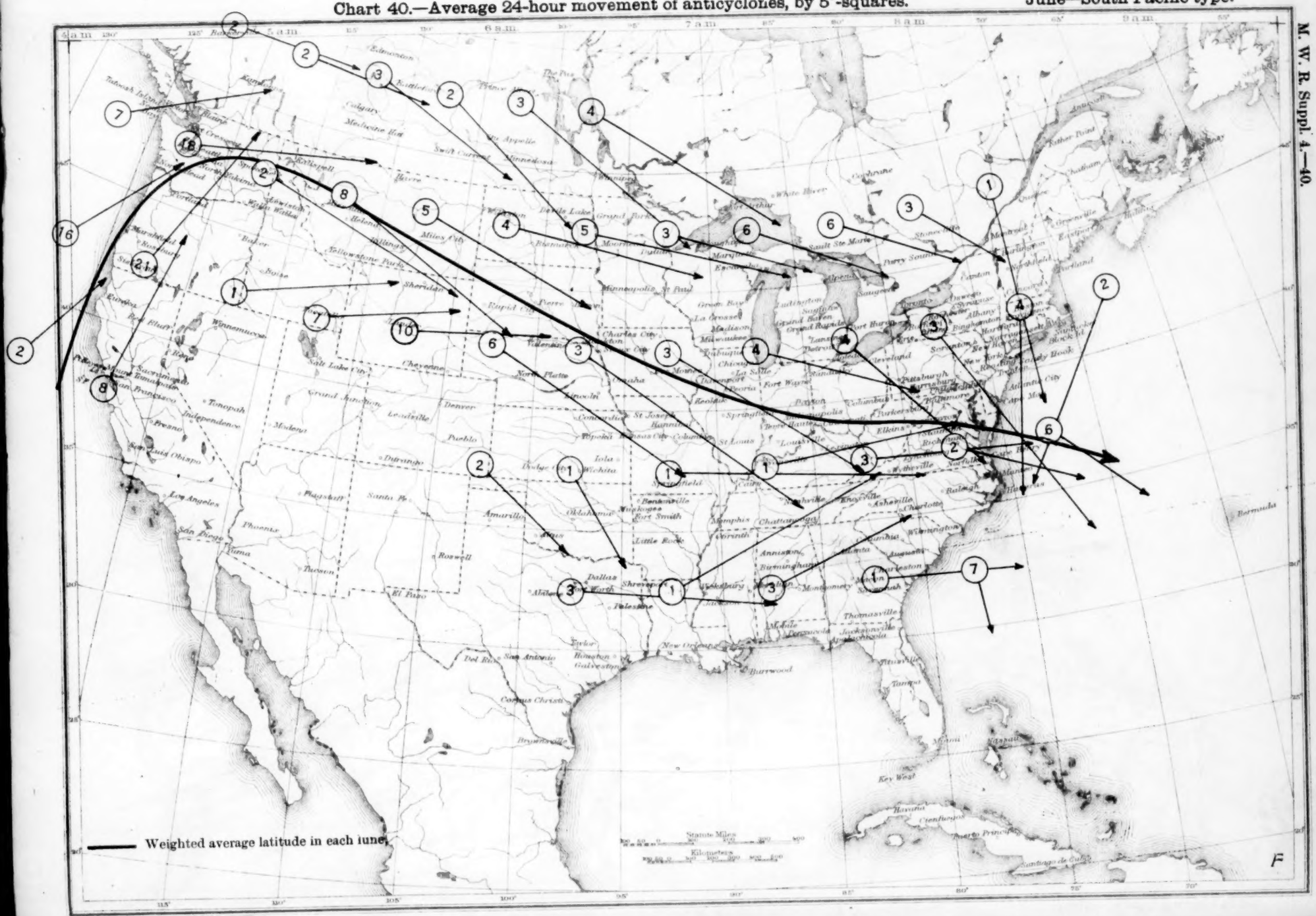

Chart 41.—Average 24-hour movement of anticyclones, by 5°-squares.

June—Alberta type.

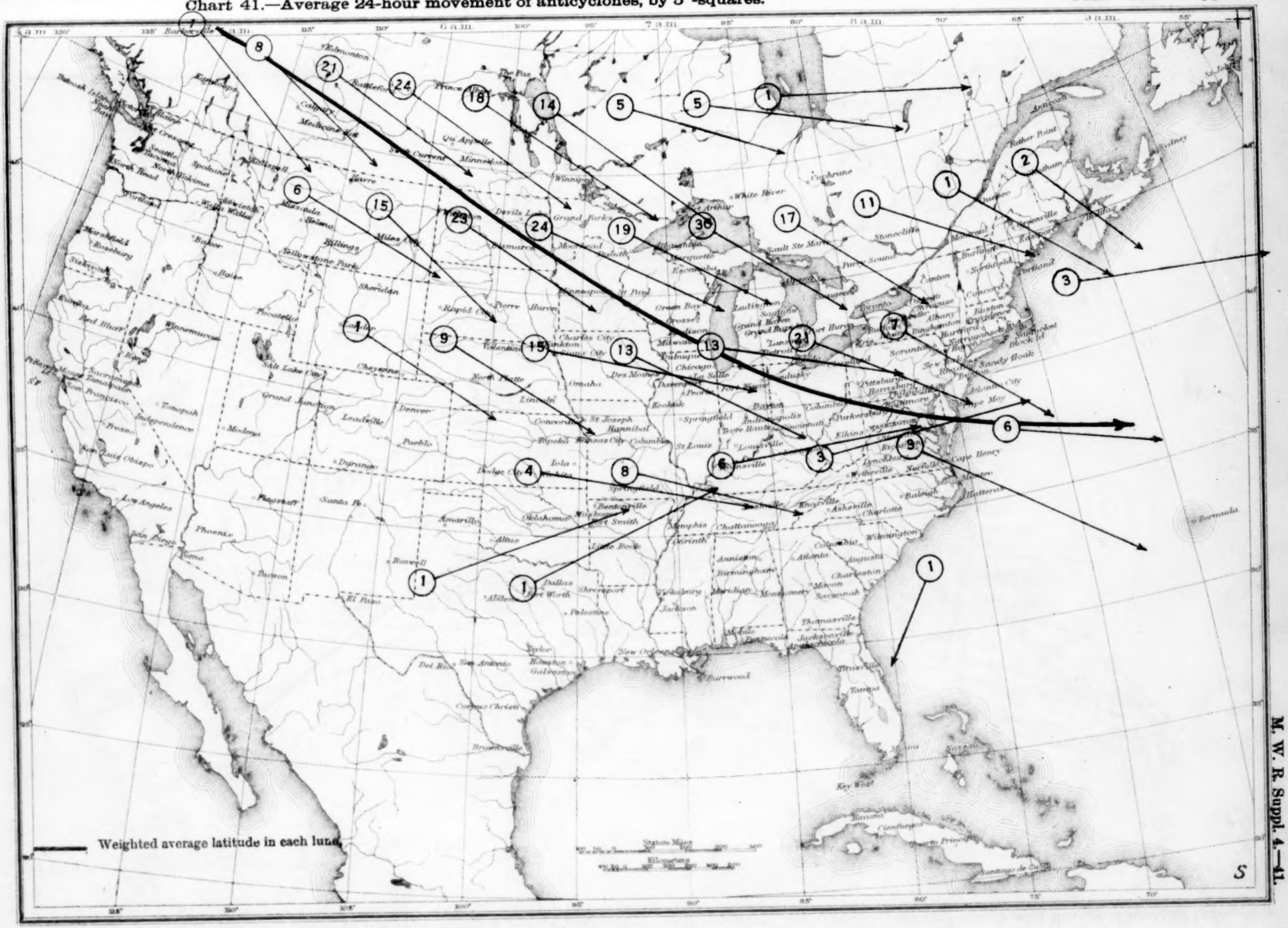

Chart 42.—Average 24-hour movement of anticyclones, by 5°-squares. June—Plateau and Rocky Mountain type.

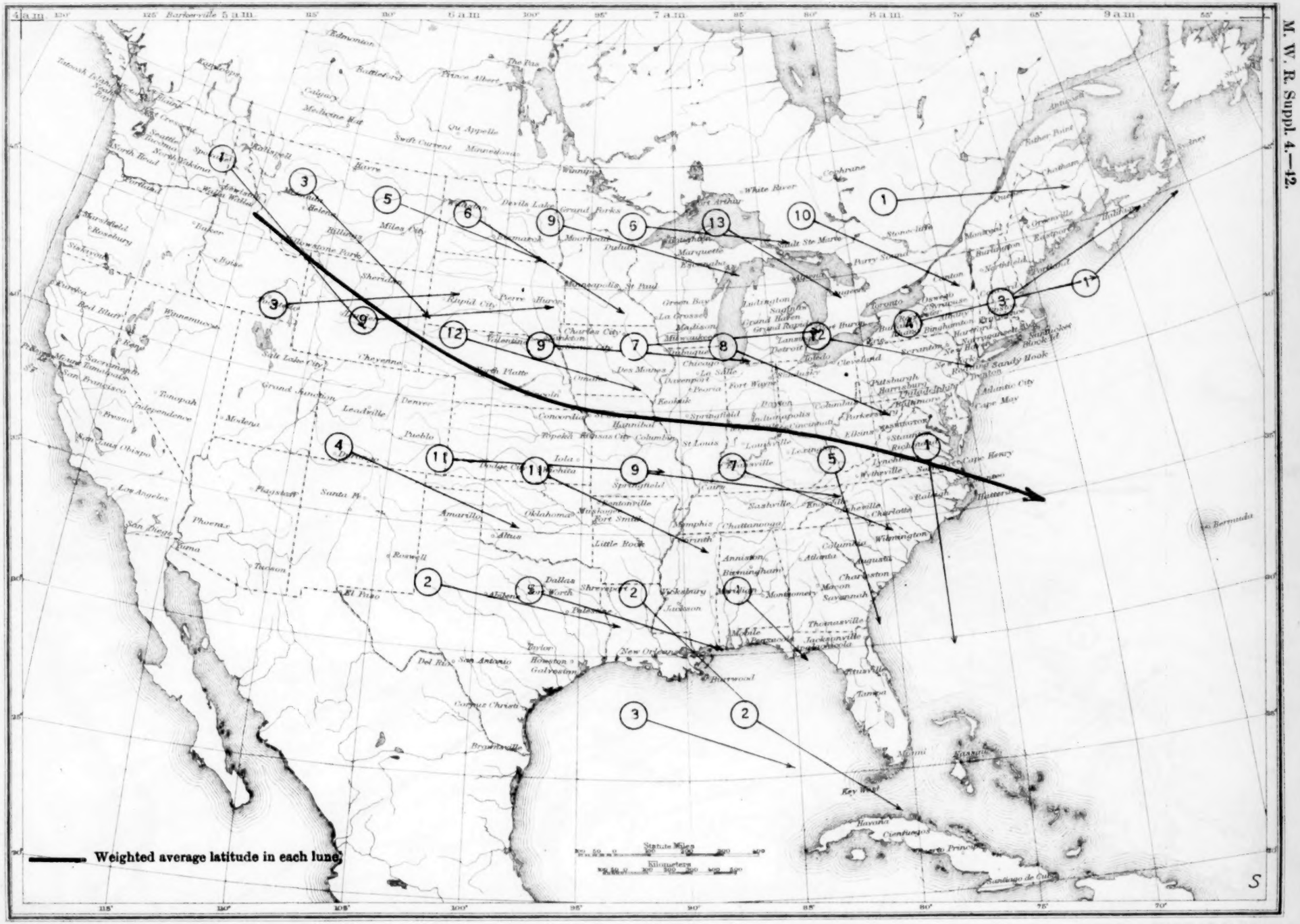

Chart 43.—Average 24-hour movement of anticyclones, by 5°-squares. June—Hudson Bay type.

Chart 44.—Average 24-hour movement of anticyclones, by 5°-squares.

July—North Pacific type.

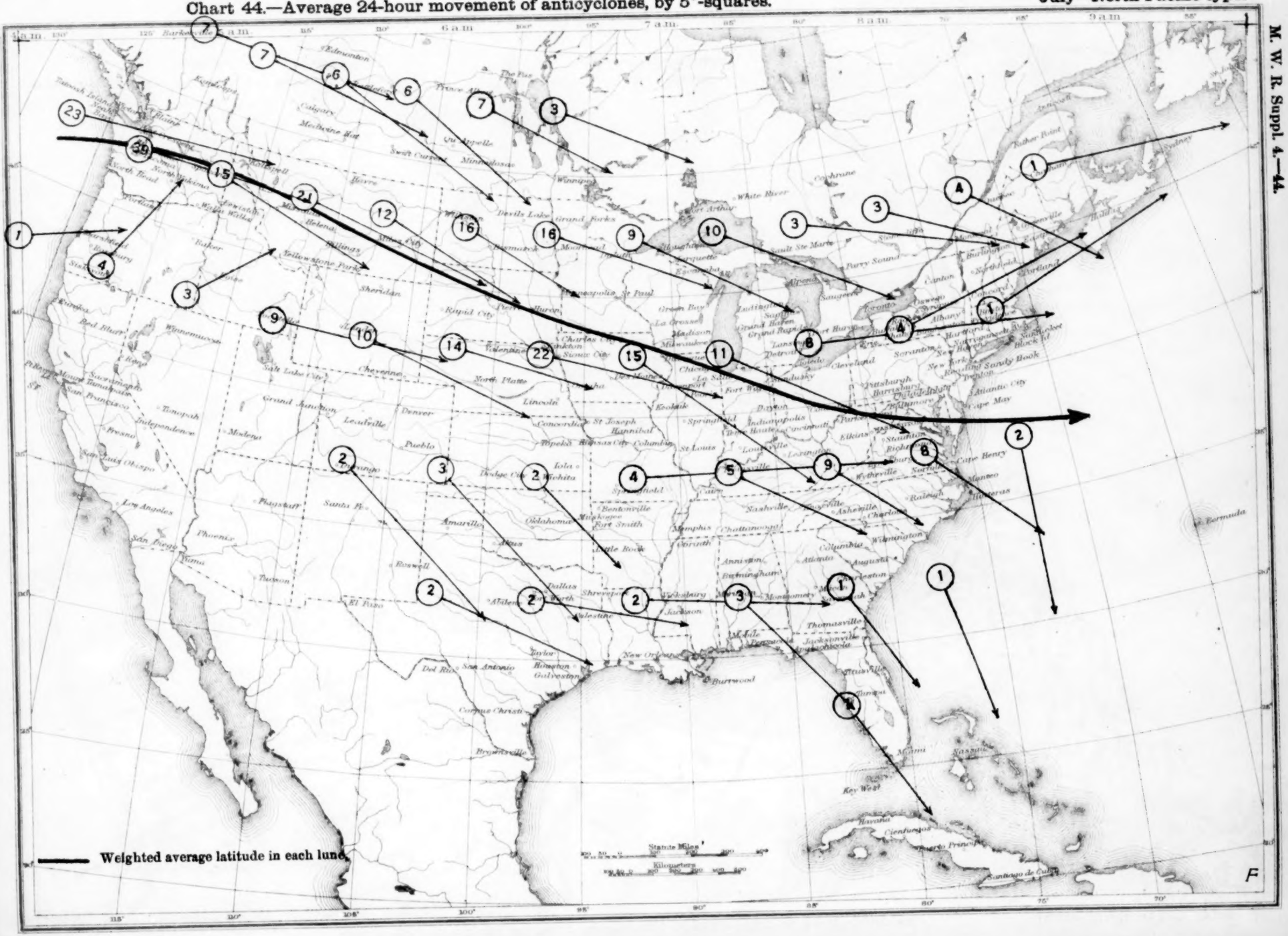

Chart 45.—Average 24-hour movement of anticyclones, by 5°-squares.

July—South Pacific type.

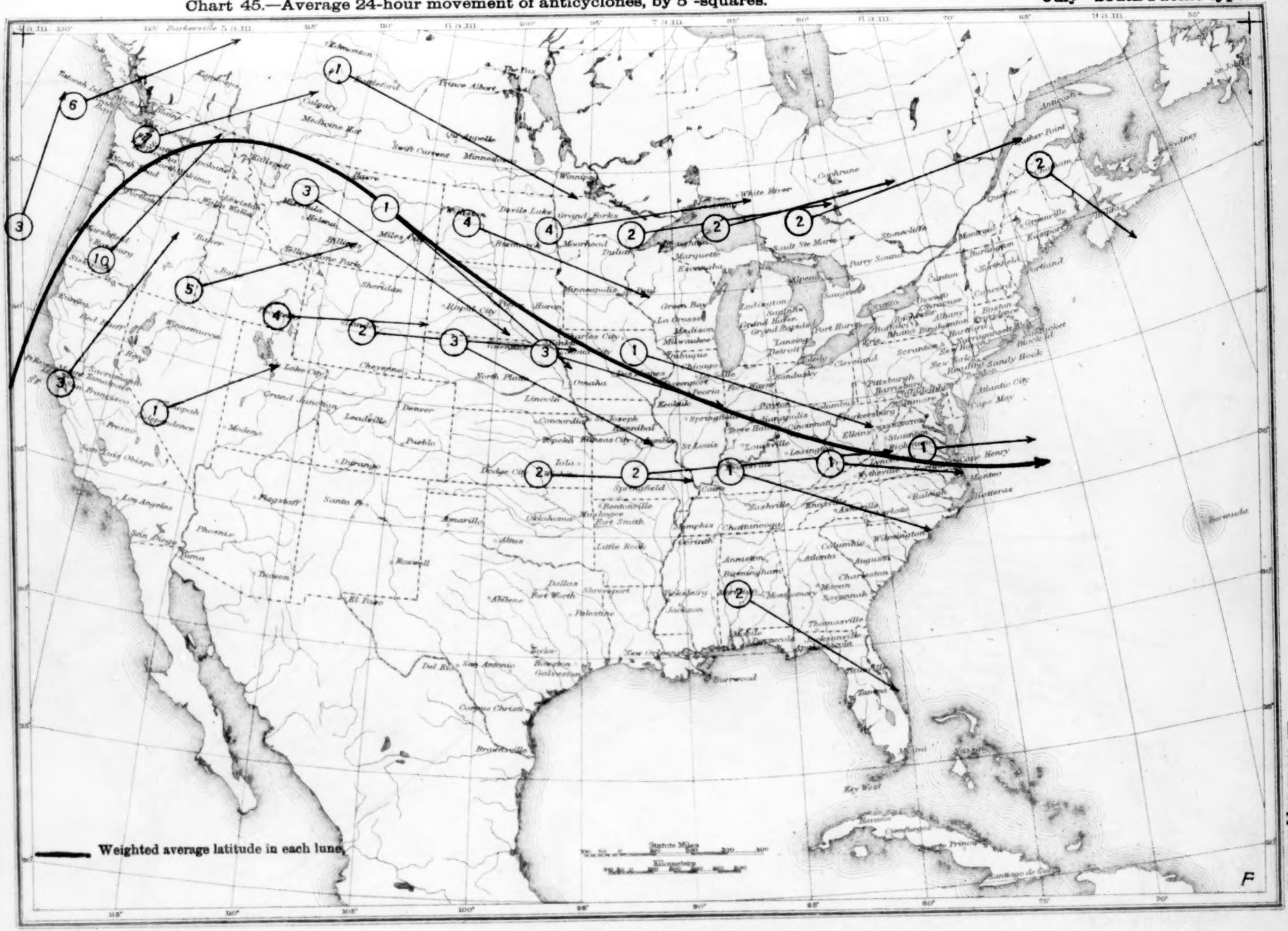

Chart 46.—Average 24-hour movement of anticyclones, by 5°-squares. July—Alberta type.

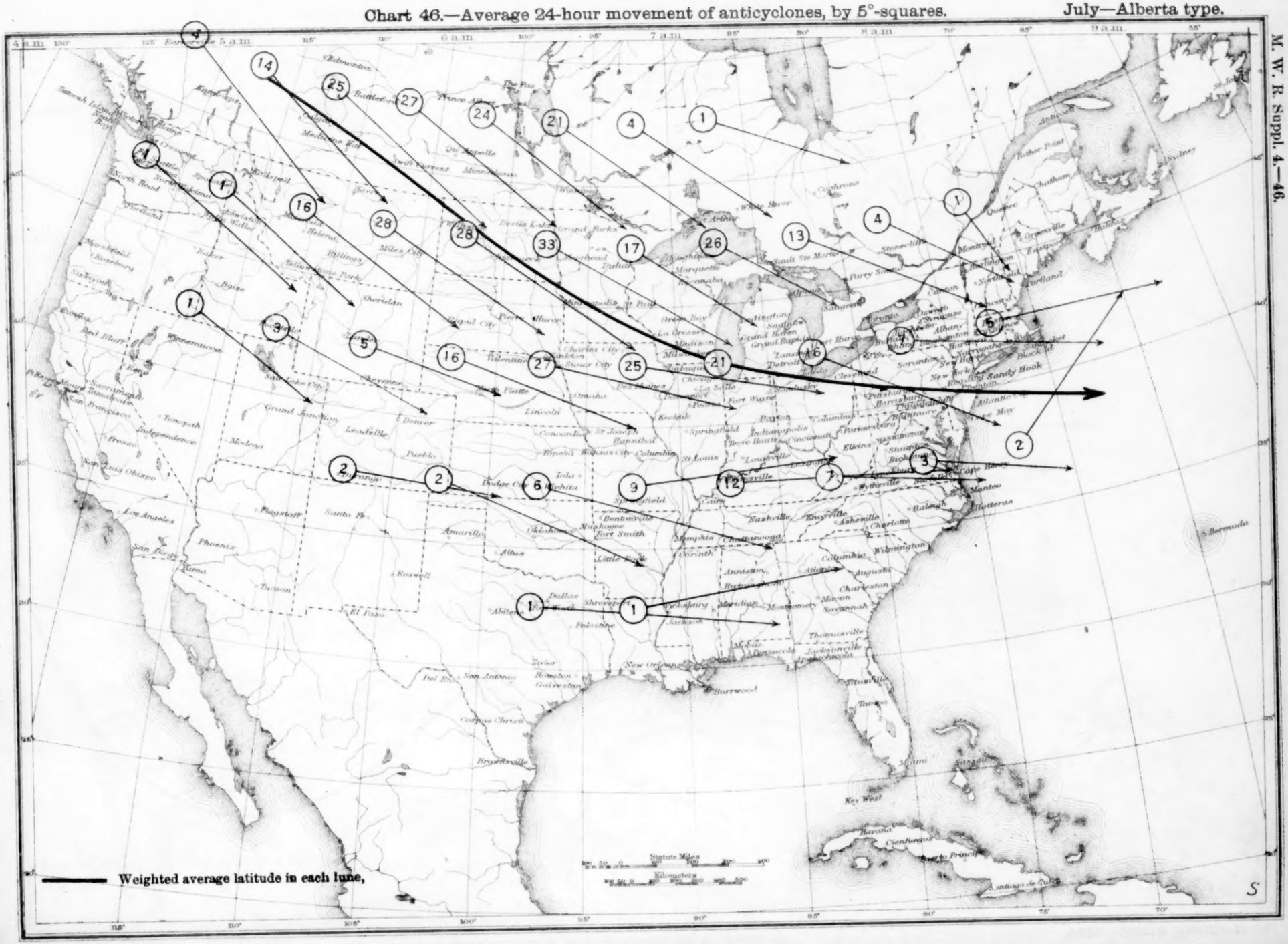

Chart 47.—Average 24-hour movement of anticyclones, by 5°-squares. July—Plateau and Rocky Mountain type.

Chart 48.—Average 24-hour movement of anticyclones, by 5°-squares. July—Hudson Bay type.

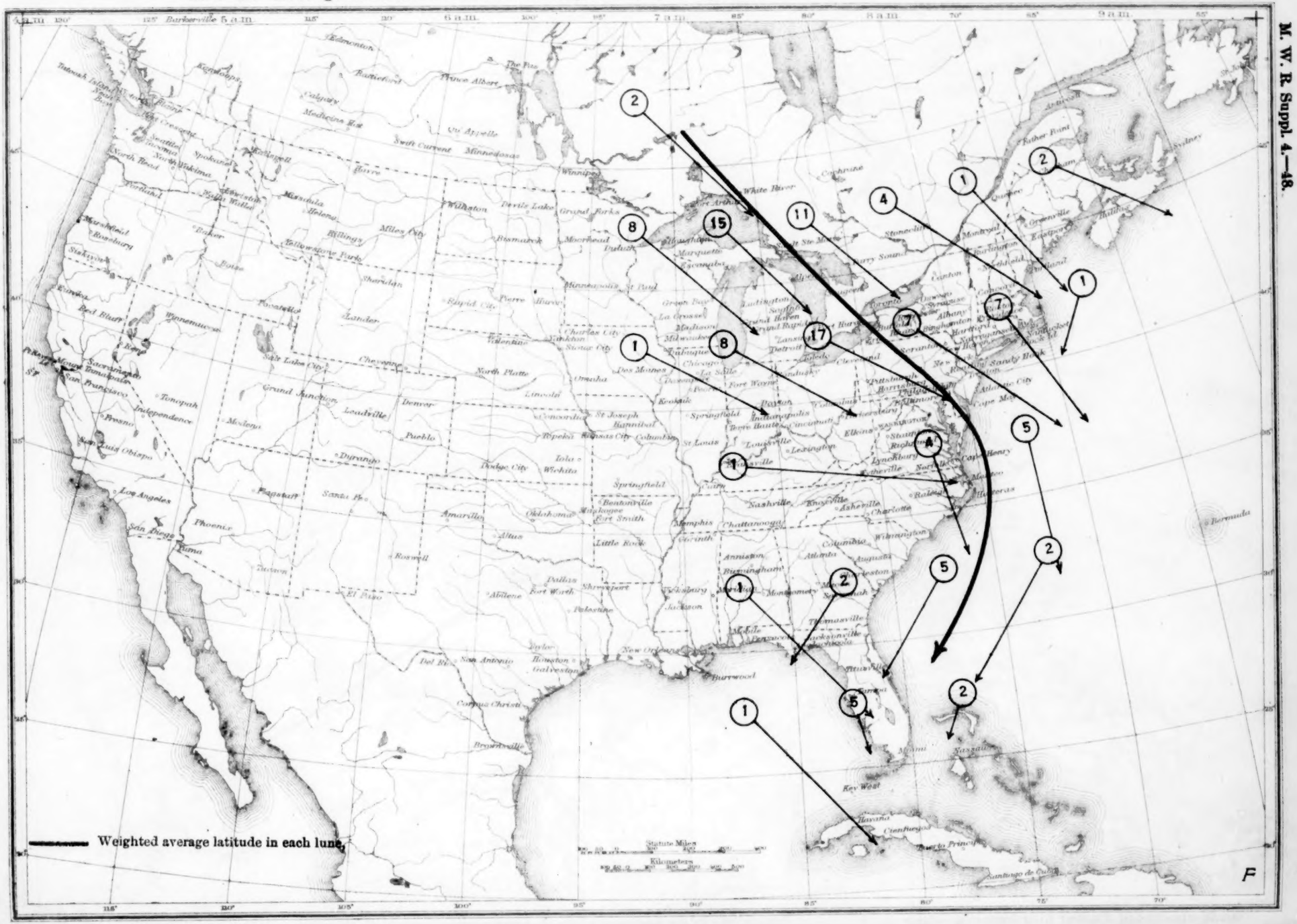

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Chart 49.—Average 24-hour movement of anticyclones, by 5°-squares. August—North Pacific type.

Chart 50.—Average 24-hour movement of anticyclones, by 5°-squares. August—South Pacific type.

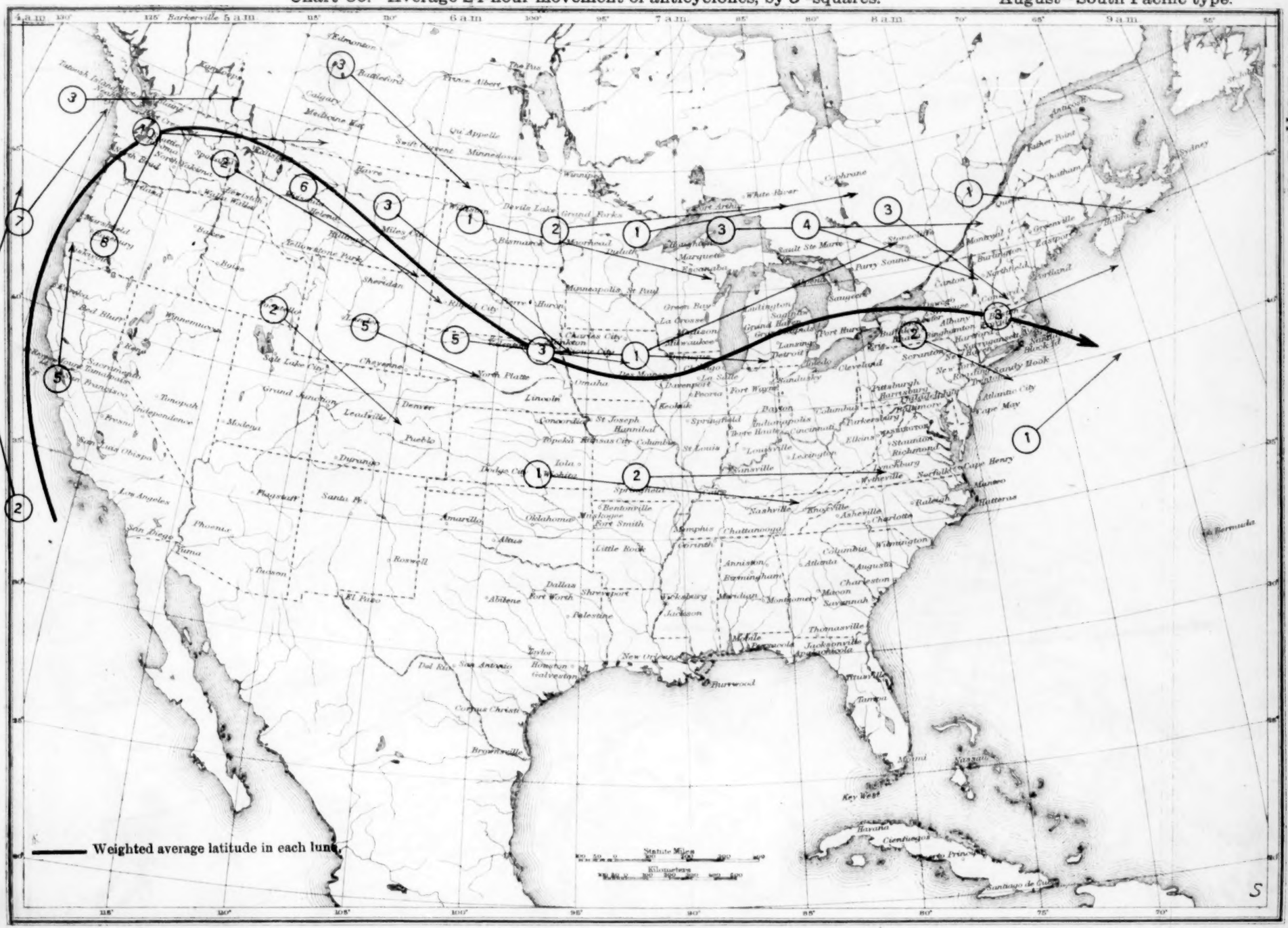

Chart 51.—Average 24-hour movement of anticyclones, by 5°-squares. August—Alberta type.

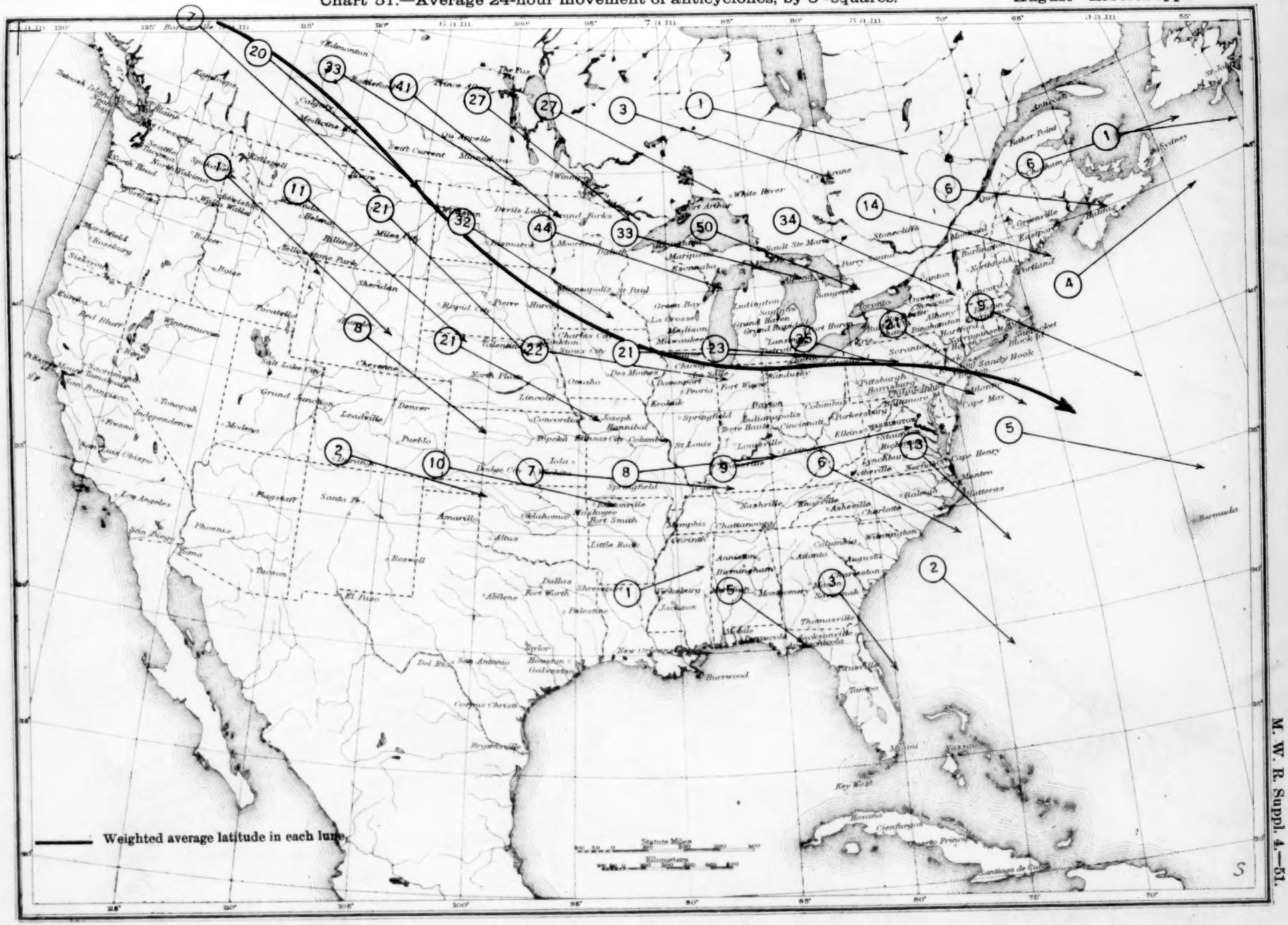

Chart 52.—Average 24-hour movement of anticyclones, by 5°-squares. August—Plateau and Rocky Mountain type.

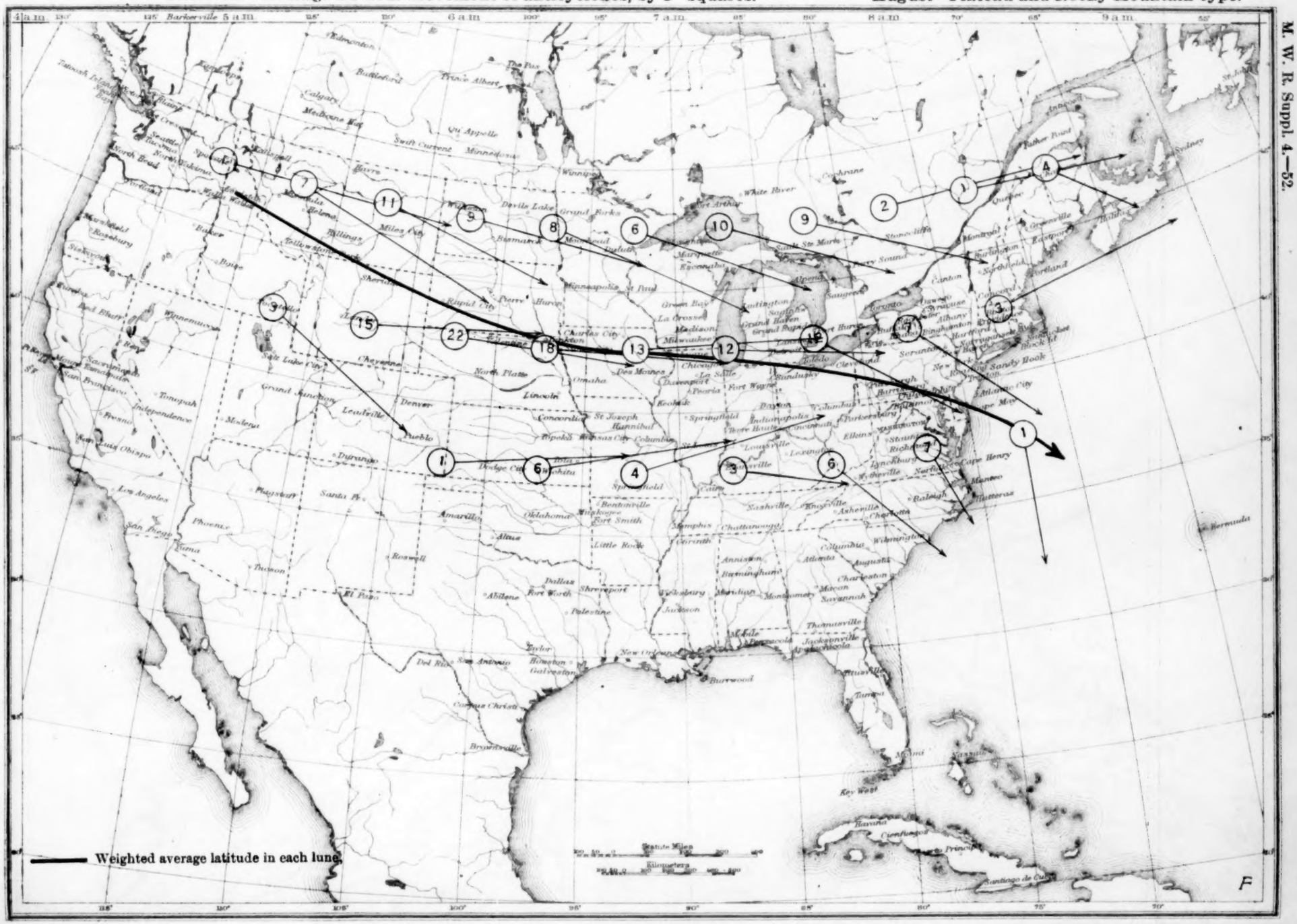

Chart 53.—Average 24-hour movement of anticyclones, by 5°-squares. August—Hudson Bay type.

Chart 54.—Average 24-hour movement of anticyclones, by 5°-squares. September—North Pacific type.

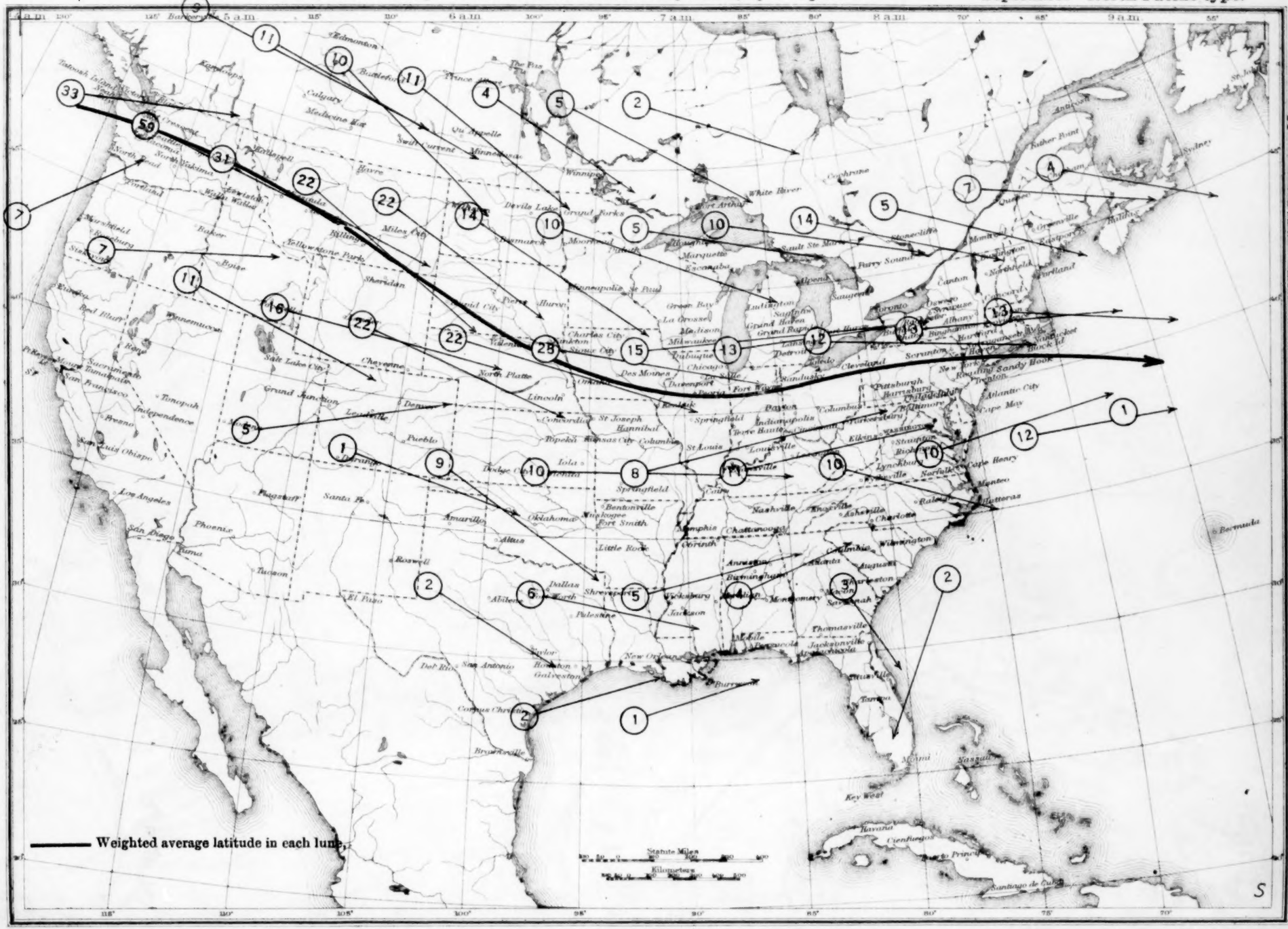

Chart 55.—Average 24-hour movement of anticyclones, by 5°-squares. September—South Pacific type.

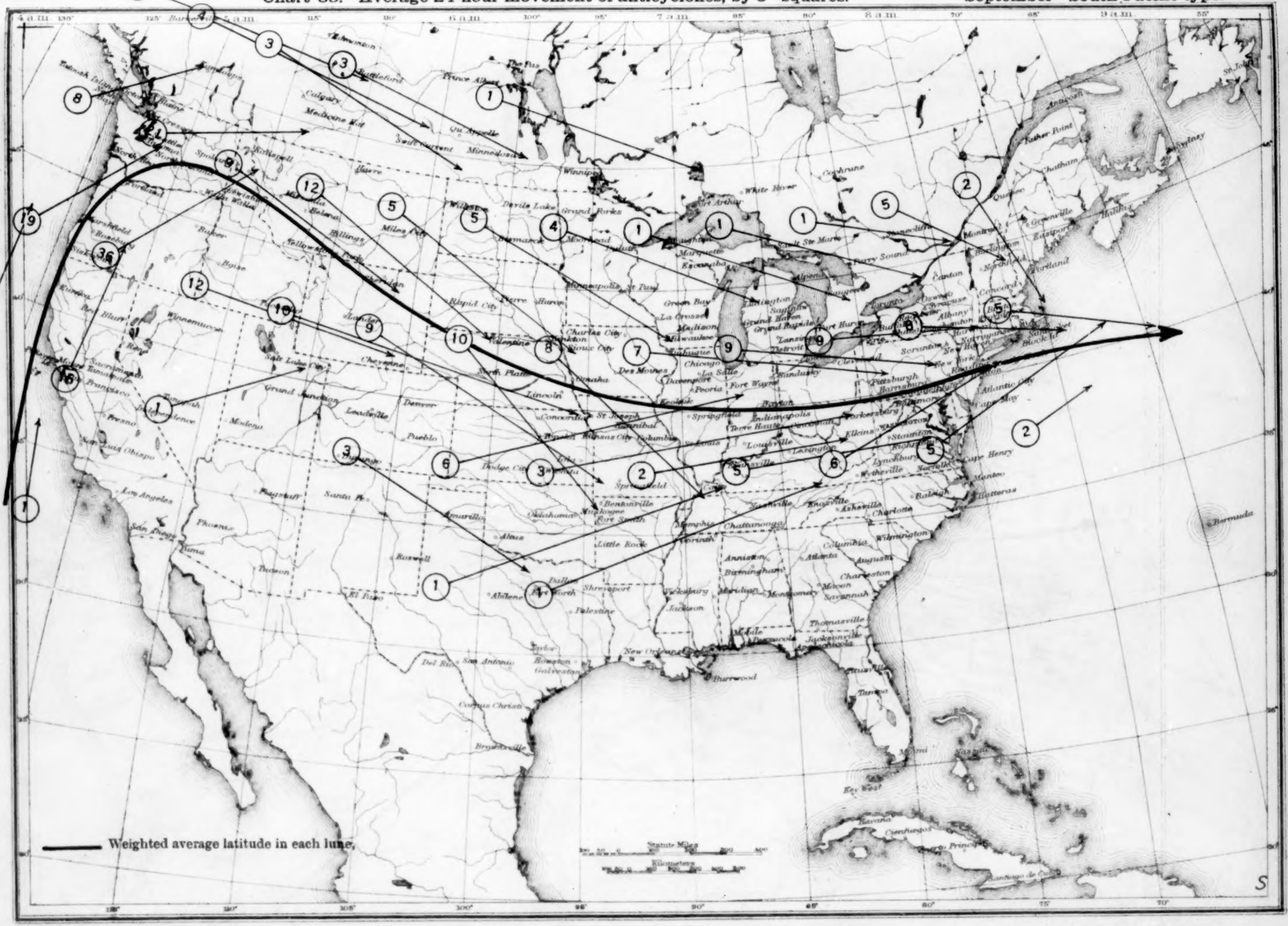

Chart 56.—Average 24-hour movement of anticyclones, by 5°-squares. September—Alberta type.

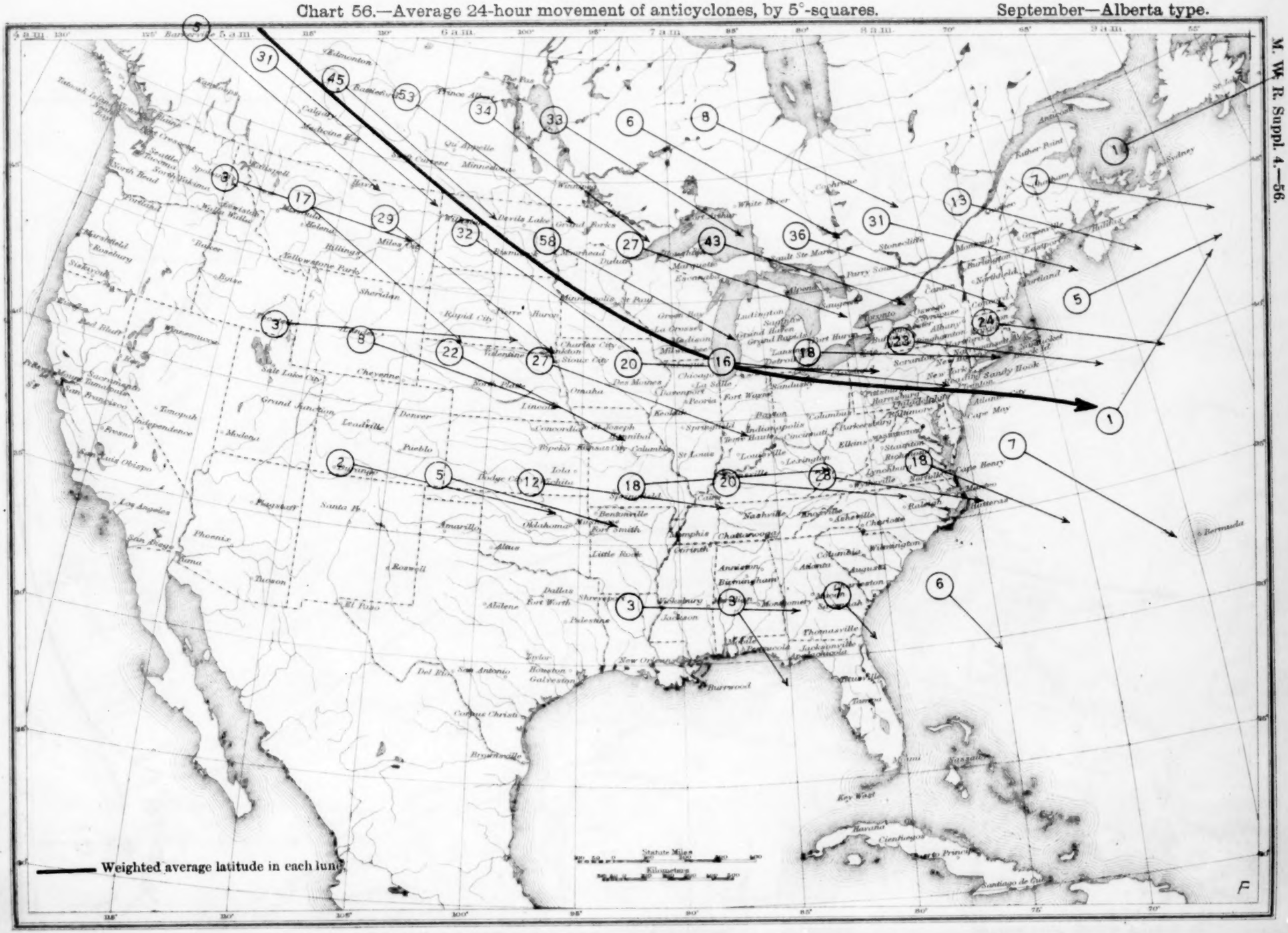

Chart 57.—Average 24-hour movement of anticyclones, by 5°-squares. September—Plateau and Rocky Mountain type.

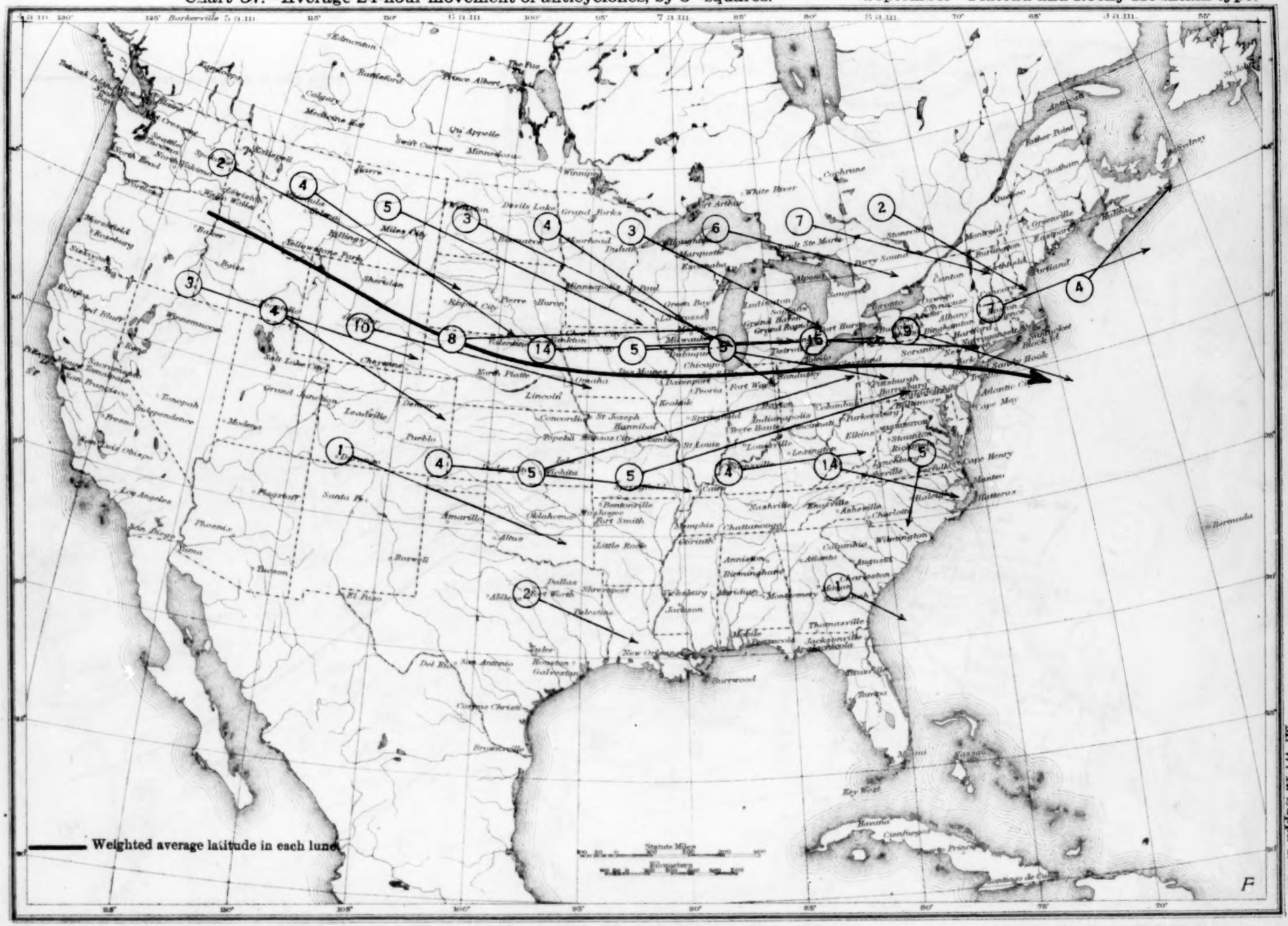

Chart 58.—Average 24-hour movement of anticyclones, by 5°-squares. September—Hudson Bay type.

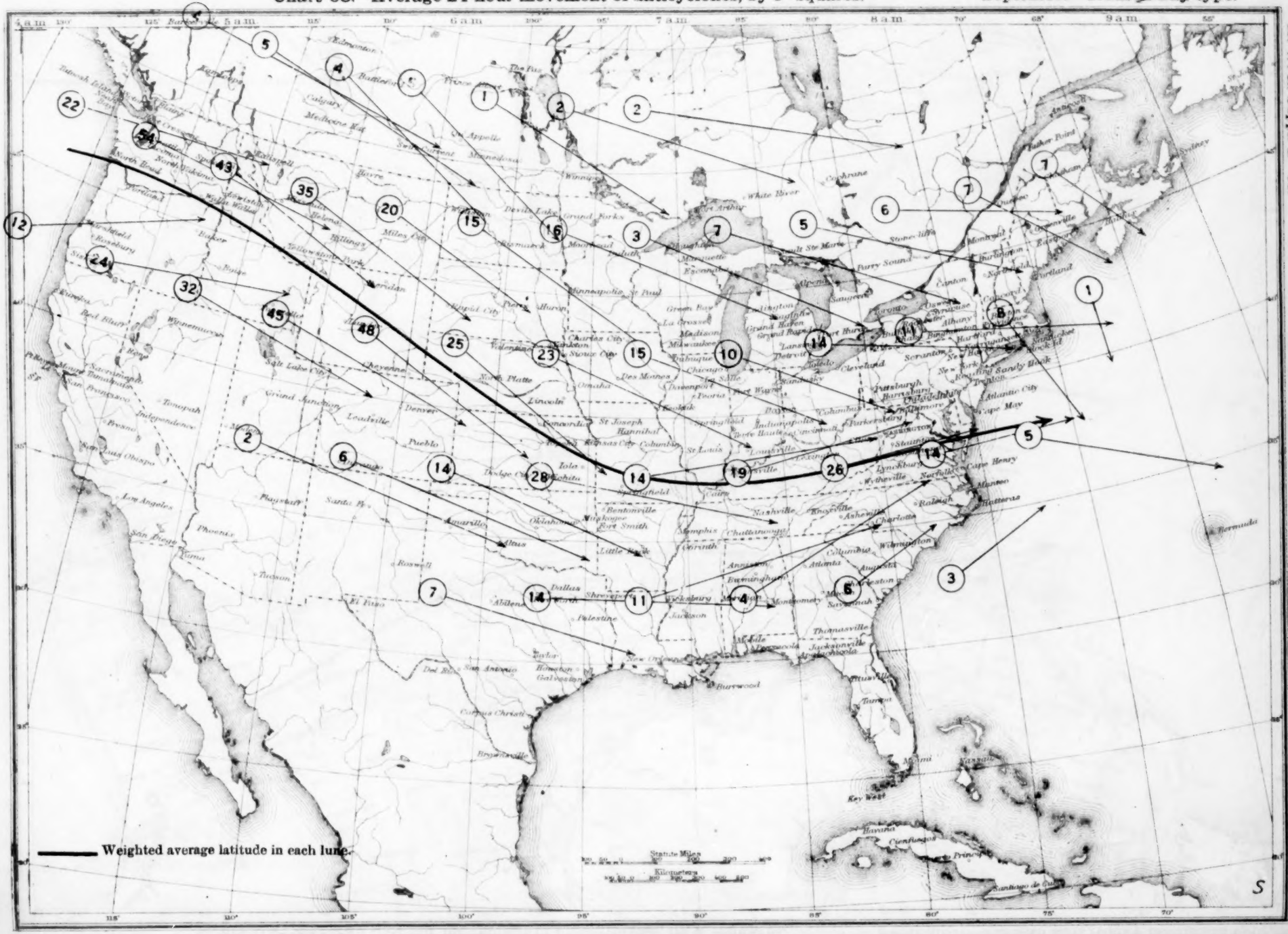

Chart 59.—Average 24-hour movement of anticyclones, by 5°-squares. Sept H B October—North Pacific type.

Chart 60.—Average 24-hour movement of anticyclones, by 5°-squares. October—South Pacific type.

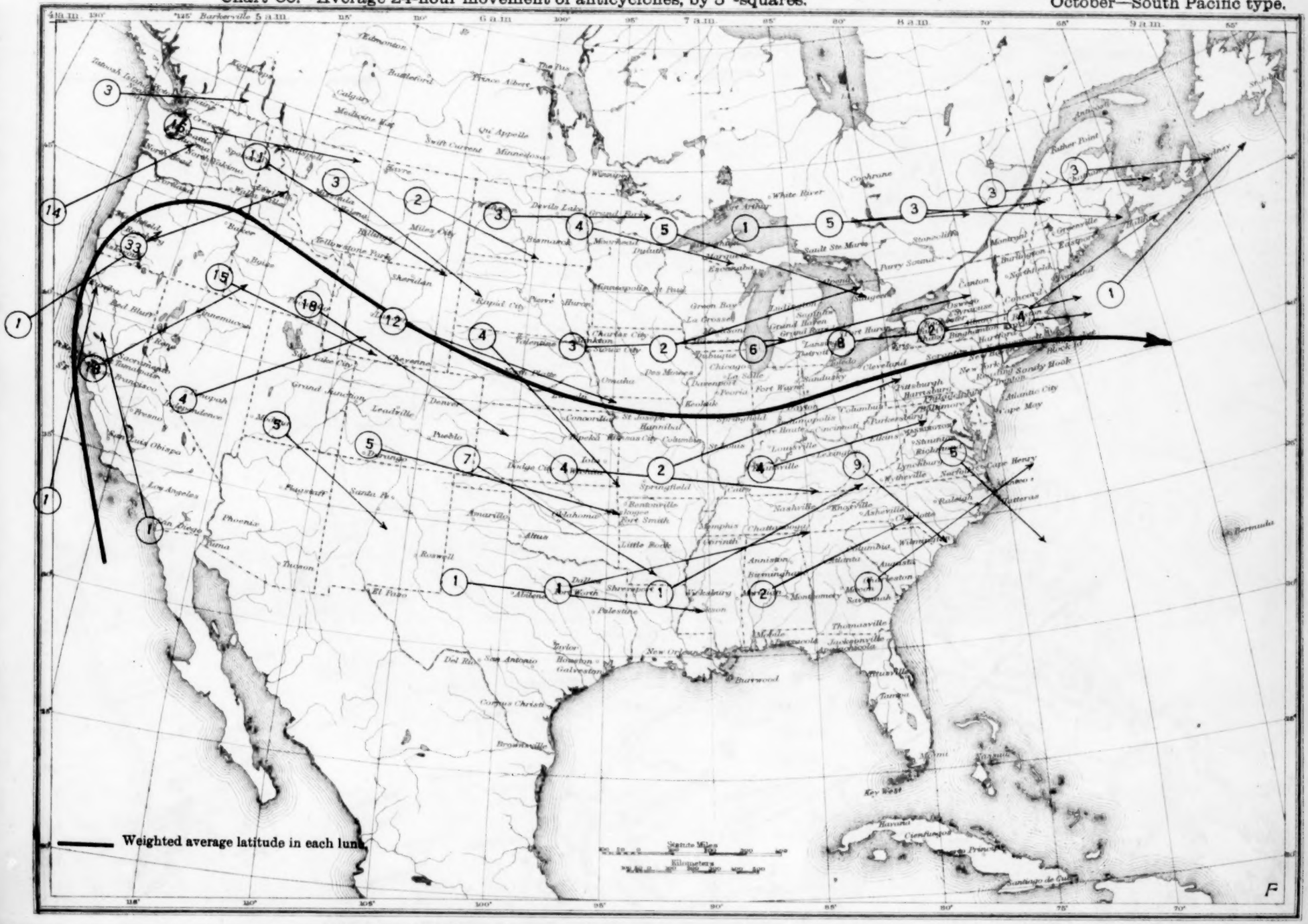

Chart 61.—Average 24-hour movement of anticyclones, by 5°-squares. October—Alberta type.

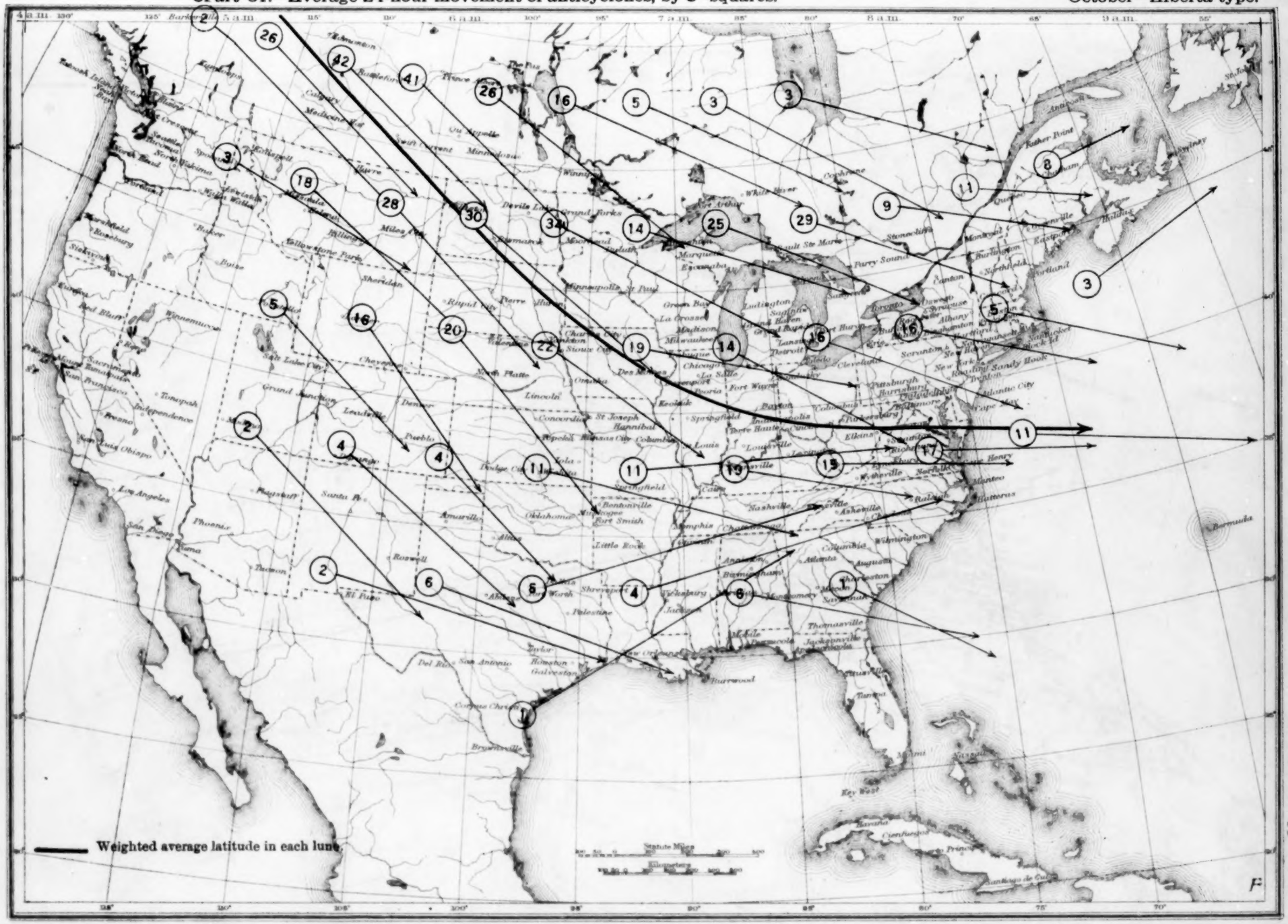

Chart 62.—Average 24-hour movement of anticyclones, by 5°-squares. October—Plateau and Rocky Mountain type.

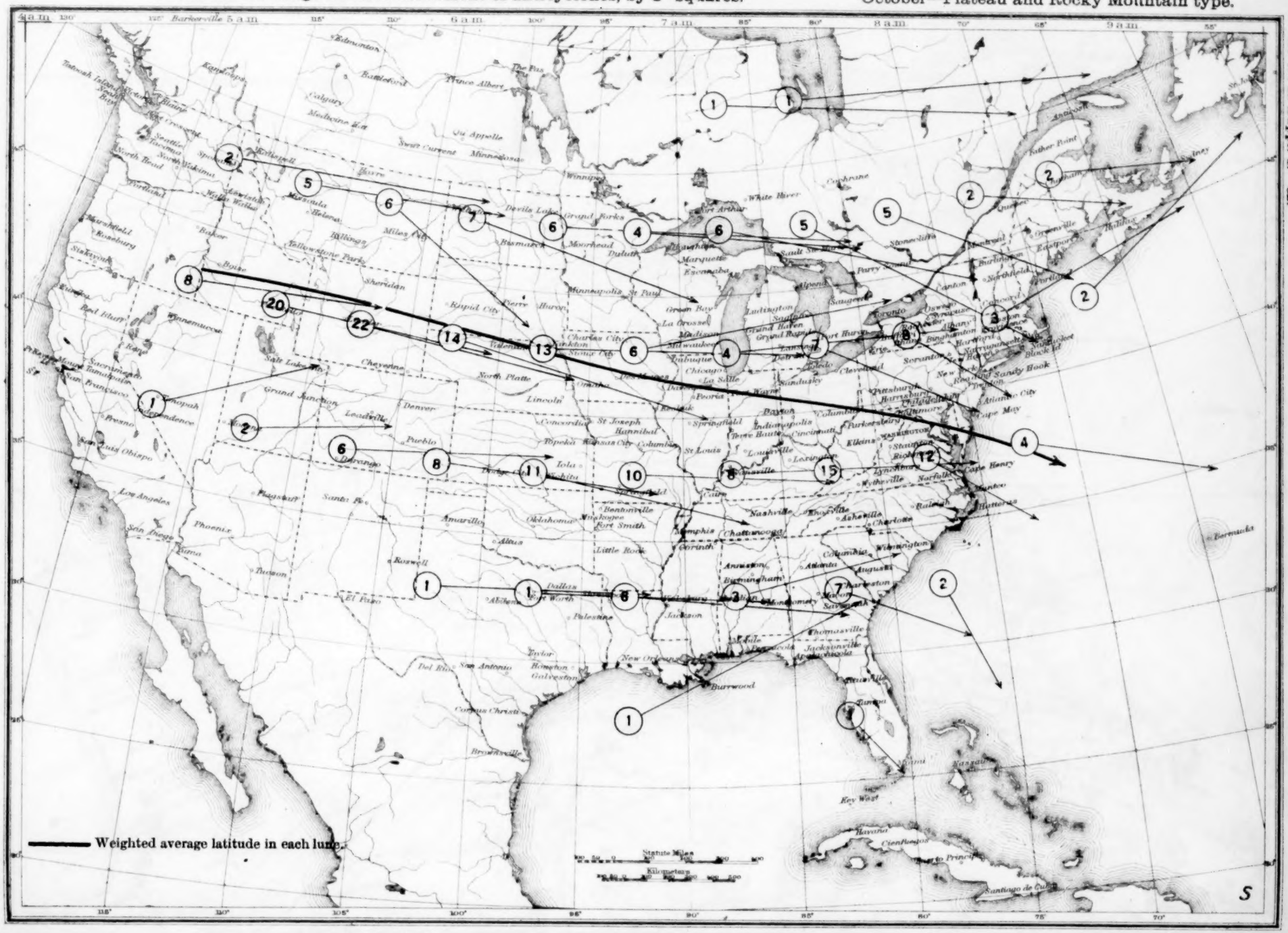

Chart 63.—Average 24-hour movement of anticyclones, by 5°-squares. October—Hudson Bay type.

Chart 64.—Average 24-hour movement of anticyclones, by 5°-squares. November—North Pacific type.

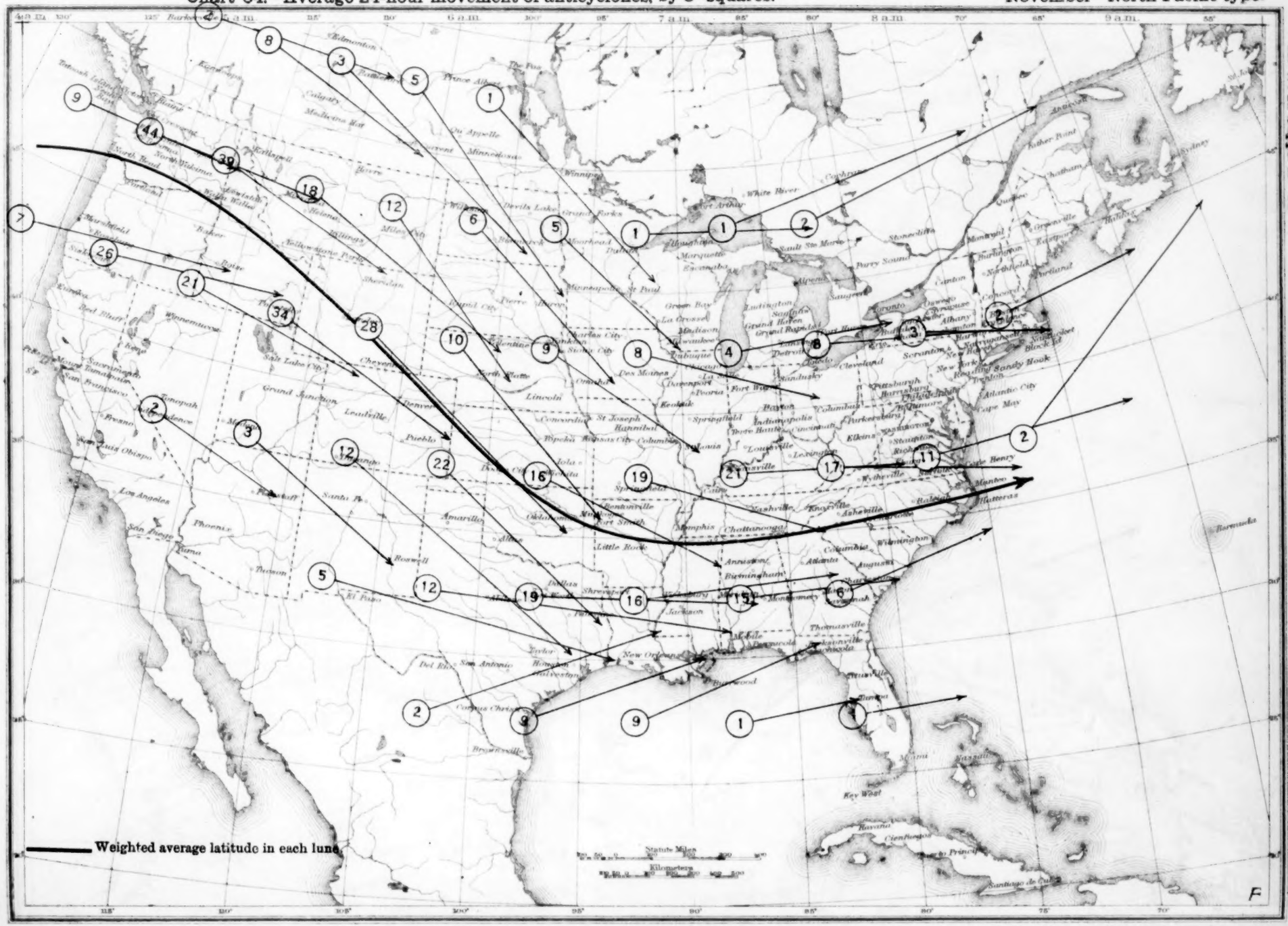

Chart 65.—Average 24-hour movement of anticyclones, by 5°-squares. November—South Pacific type.

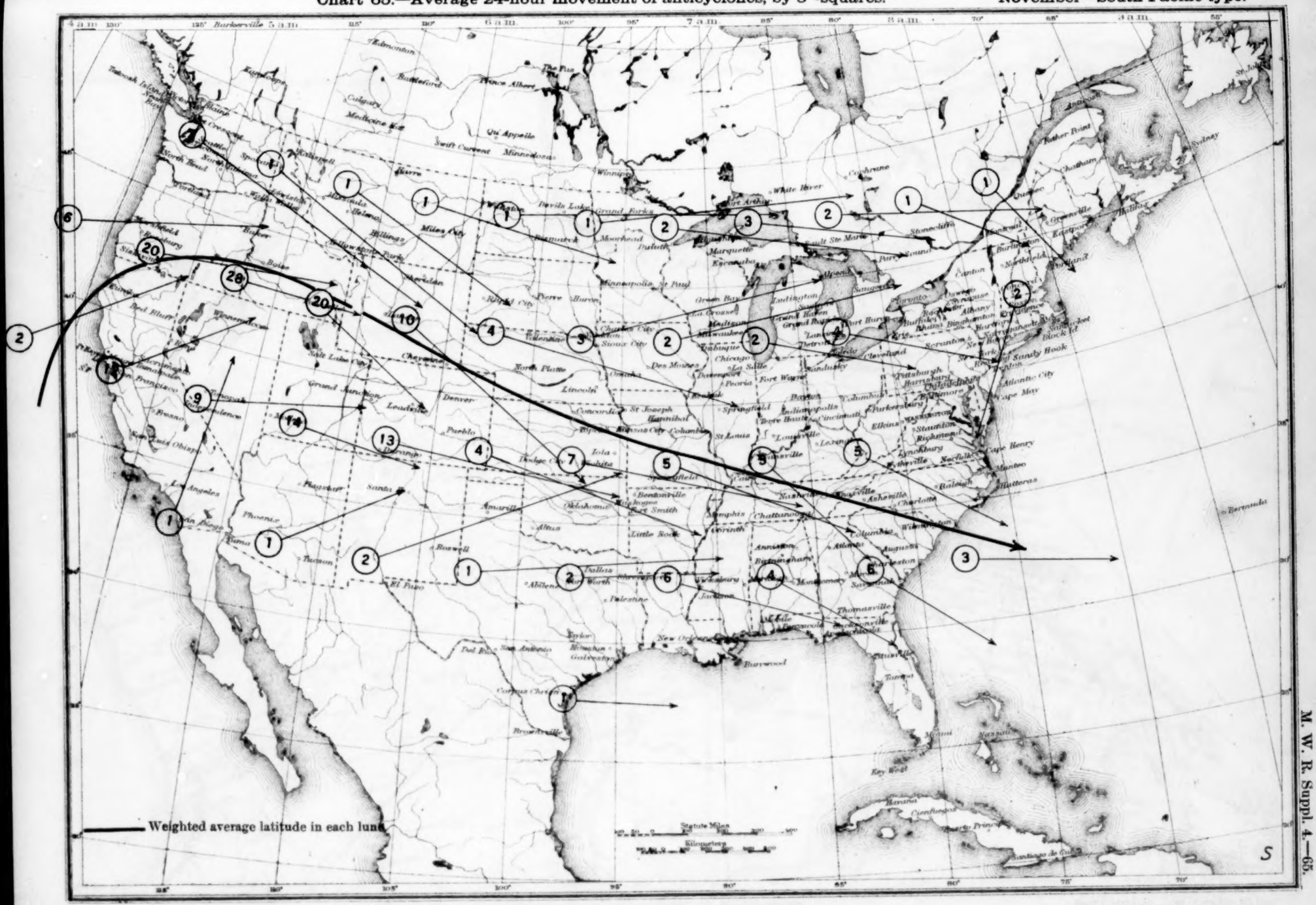

Chart 66.—Average 24-hour movement of anticyclones, by 5°-squares. November—Alberta type.

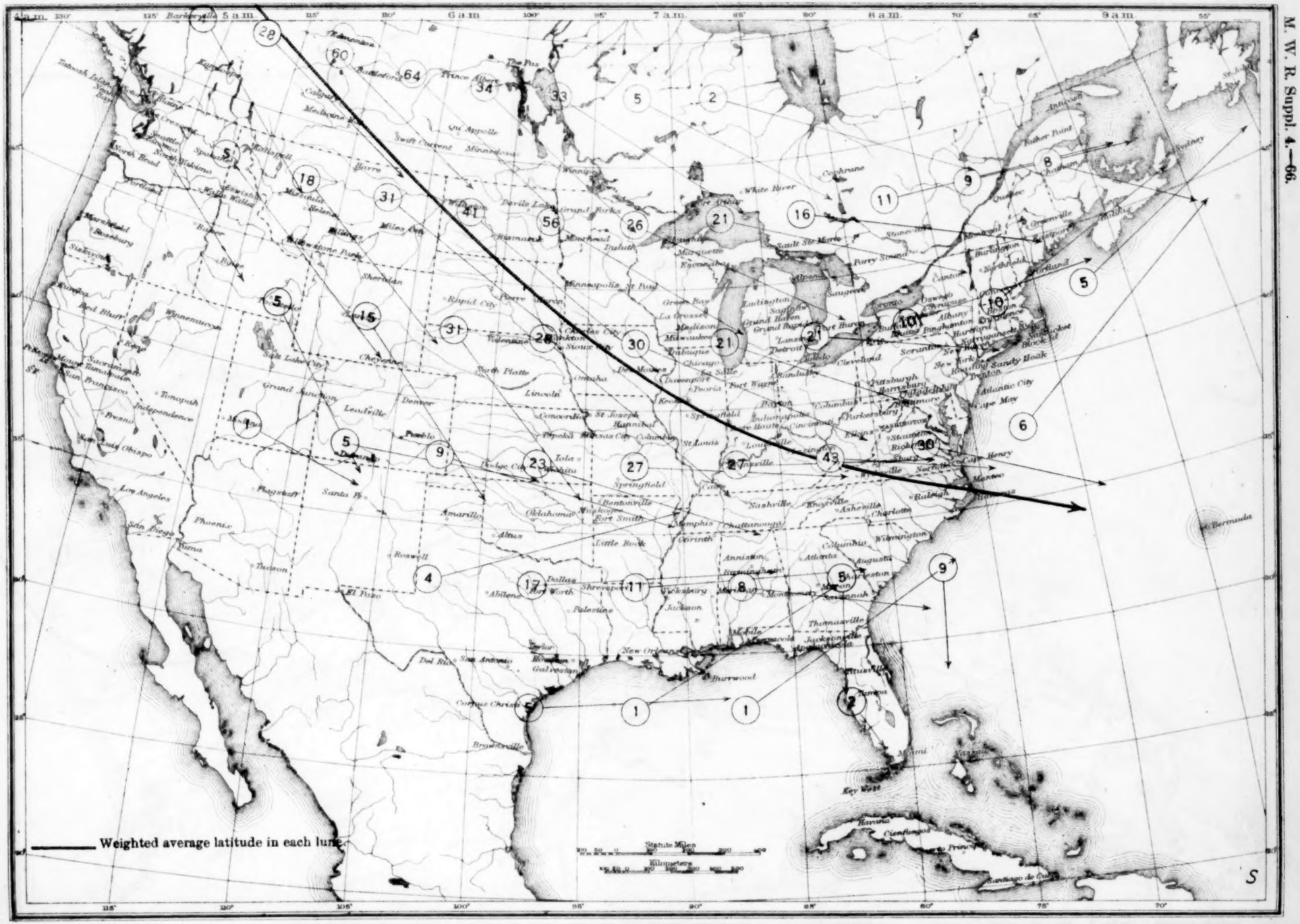

Chart 67.—Average 24-hour movement of anticyclones, by 5°-squares. November—Plateau and Rocky Mountain type.

Chart 68.—Average 24-hour movement of anticyclones, by 5°-squares. November—Hudson Bay type.

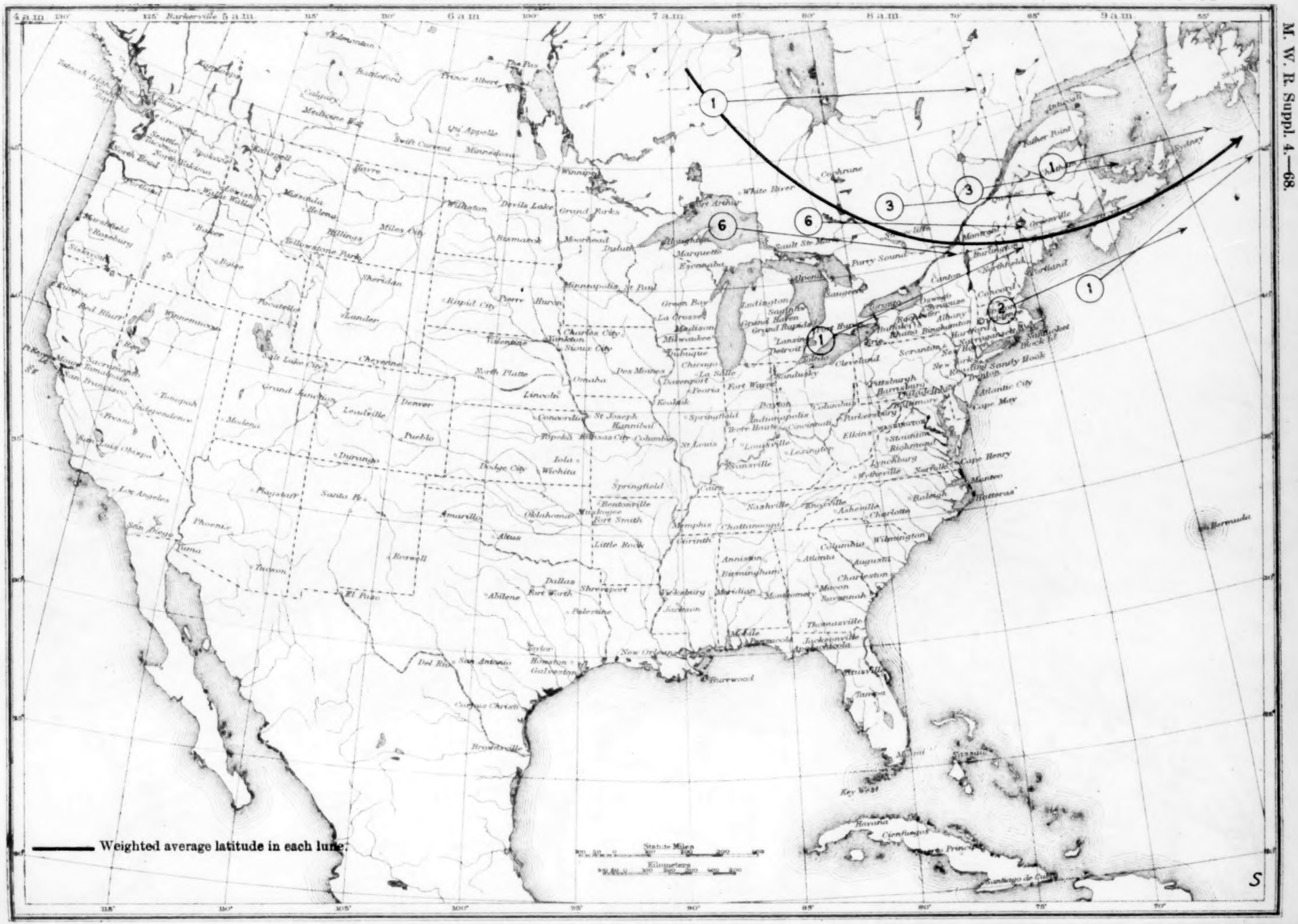

Chart 69.—Average 24-hour movement of anticyclones, by 5°-squares. December—North Pacific type.

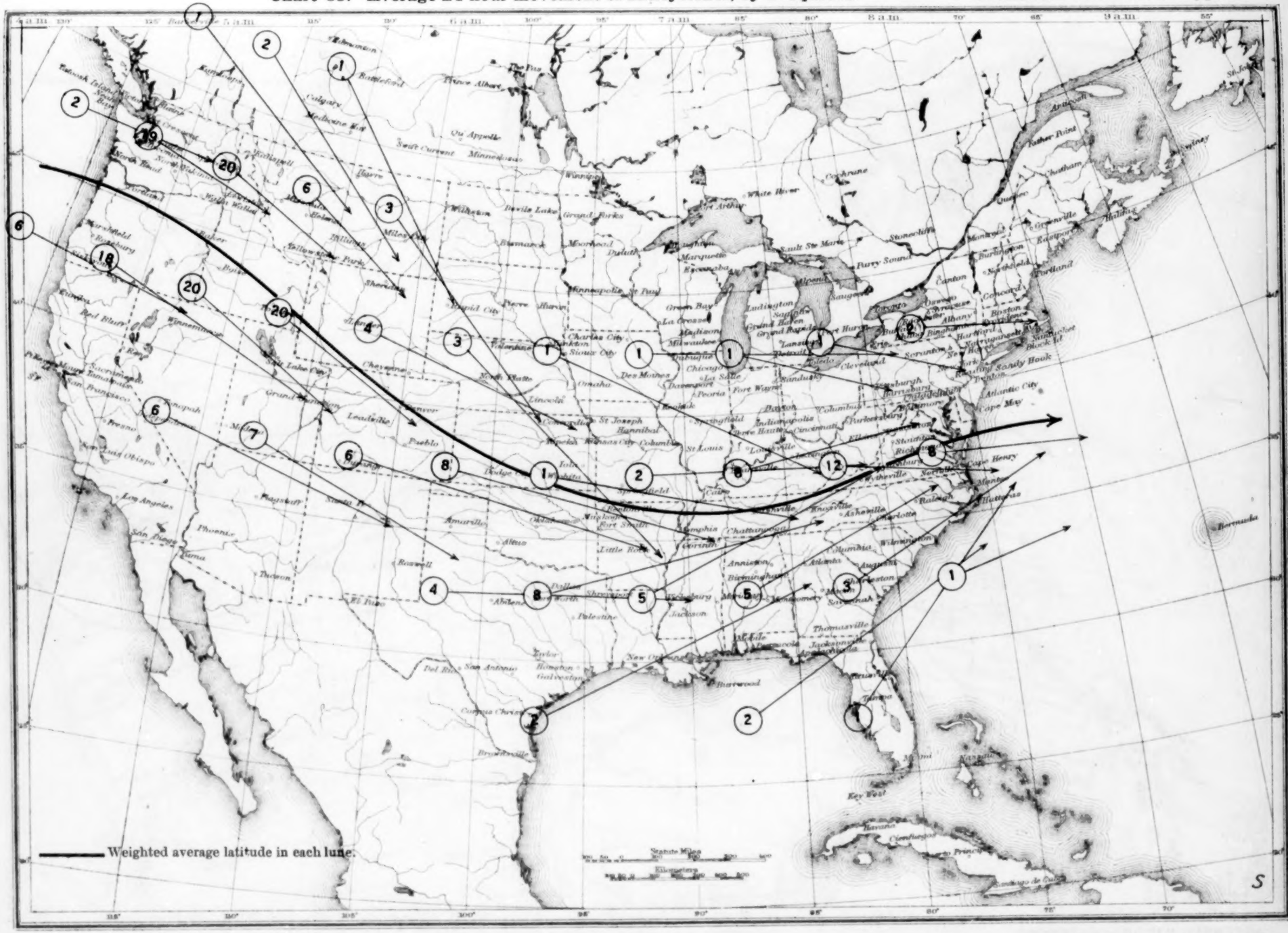

Chart 70.—Average 24-hour movement of anticyclones, by 5°-squares. December—South Pacific type.

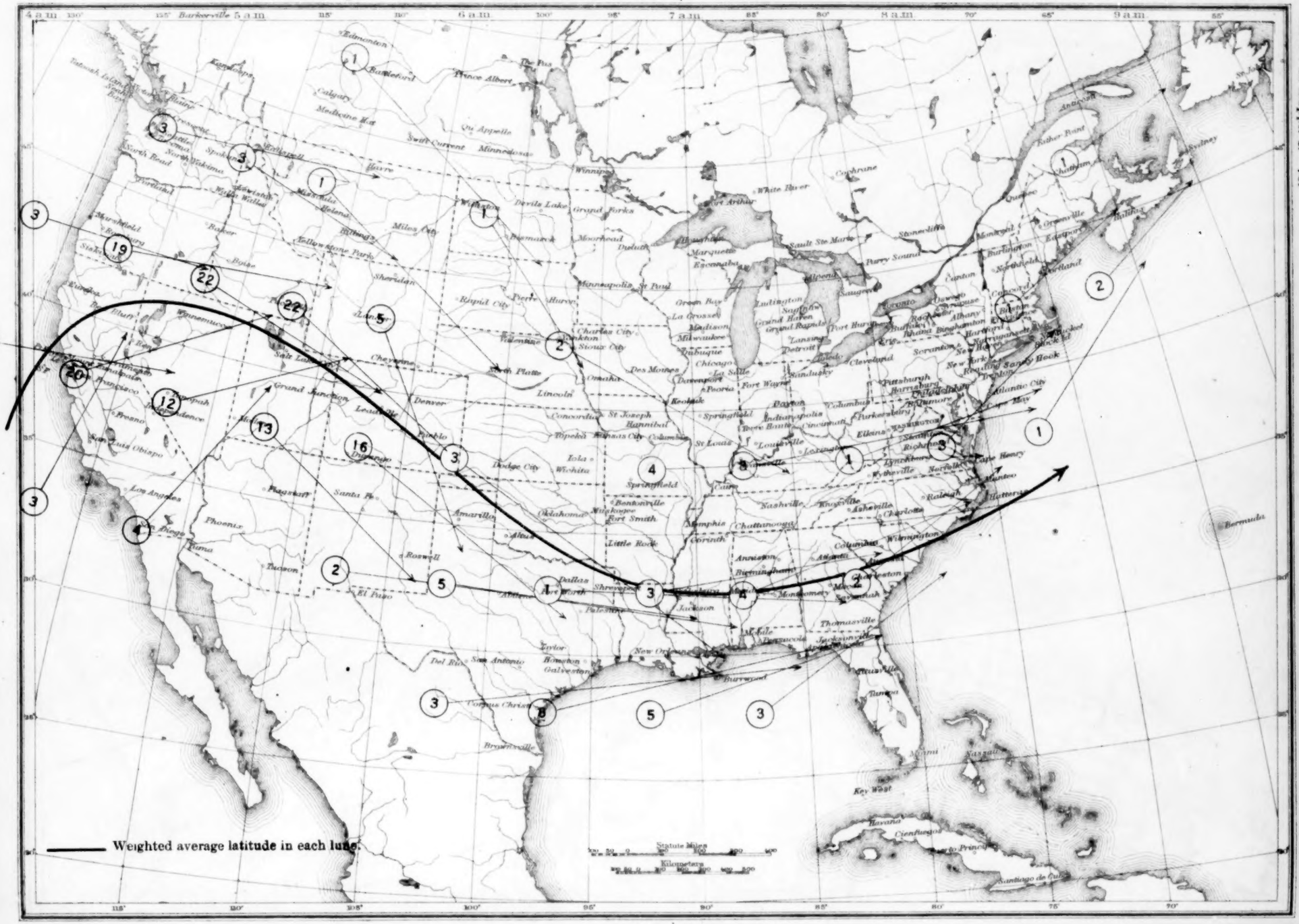

Chart 71.—Average 24-hour movement of anticyclones, by 5°-squares. December—Alberta type.

Chart 72.—Average 24-hour movement of anticyclones, by 5°-squares. December—Plateau and Rocky Mountain type.

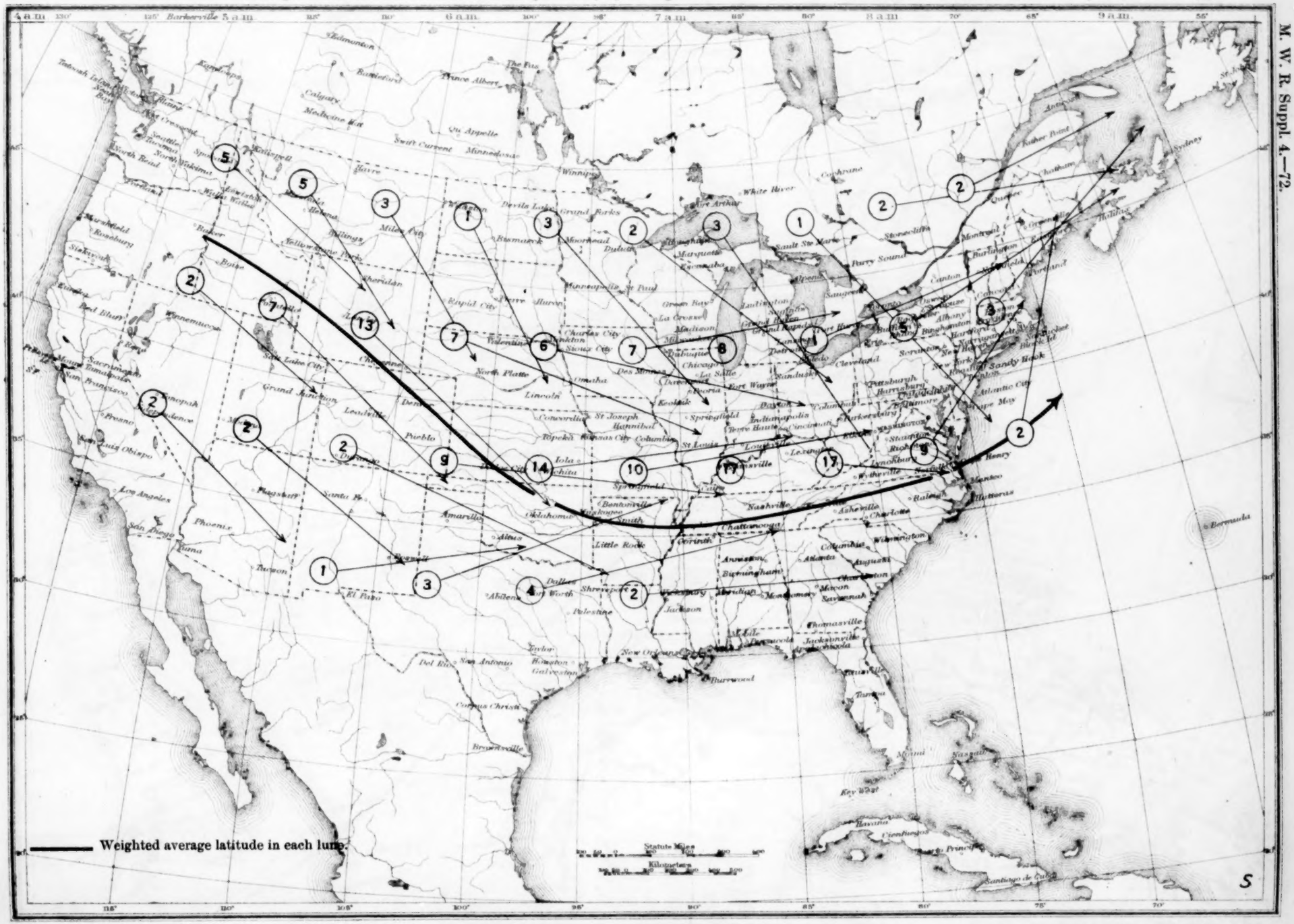

Chart 73.—Average 24-hour movement of anticyclones, by 5°-squares. **December—Hudson Bay type**